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Pulsar Glitch Activities: The Spin Parameters Approach

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Abstract

Glitch activity refers to the mean increase in pulsar spin frequency per year due to rotational glitches. It is an important tool for studying super-nuclear matter using neutron star interiors as templates. Glitch events are typically observed in the spin frequency (ν) and frequency derivative ($\dot{\nu}$) of pulsars. The rate of glitch recurrence decreases as the pulsar ages, and the activity parameter is usually measured by linear regression of cumulative glitches over a given period. This method is effective for pulsars with multiple regular glitch events. However, due to the scarcity of glitch events and the difficulty of monitoring all known pulsars, only a few have multiple records of glitch events. This limits the use of the activity parameter in studying neutron star interiors with multiple pulsars. In this study, we examined the relationship between the activity parameters and pulsar spin parameters (spin frequency, frequency derivative, and pulsar characteristic age). We found that a quadratic function provides a better fit for the relationship between activity parameters and spin parameters than the commonly used linear functions. Using this information, we were able to estimate the activity parameters of other pulsars that do not have records of glitches. Our analysis shows that the relationship between the estimated activity parameters and pulsar spin parameters is consistent with that of the observed activity parameters in the ensemble of pulsars.

Key words: stars: neutron – (stars:) pulsars: general – methods: statistical

1. Introduction

Pulsar glitches are sudden changes in the rotation rate of spinning neutron stars that emit beams of electromagnetic radiation (Radhakrishnan & Manchester 1969; Reichley & Downs 1969; Chukwude & Urama 2010; Yu et al. 2013; Lai & Xu 2016; Lower et al. 2021; Basu et al. 2022; Grover et al. 2023). These glitches have gained significant interest in astrophysics as they provide a means of probing the interiors of neutron stars (e.g., Lyne 1992; Link et al. 1999; Andersson et al. 2012; Eya et al. 2017a; Haskell 2018; Eya et al. 2019a). This is because the physics underlying the phenomenon, which is connected to the behavior of matter in a neutron star interior, helps to understand the behavior of matter in exotic states beyond that obtainable in terrestrial environments. The mean change in pulsar spin frequency per year due to glitches, known as glitch activity parameter (and hereafter, the activity parameter), is normally quantified by the regression of cumulative glitch sizes in a given pulsar with respect to the times those glitches were observed (McKenna & Lyne 1990). This approach is readily feasible and reliable in pulsars with multiple regular glitches. However, the paucity of glitch events in many pulsars is now a bane to a comprehensive understanding of the nature of neutron star interior via glitch activity parameters. Hence, there is a need to devise other means of quantifying the expected activity parameters of pulsars (see Eya et al. 2022, for a recent attempt). If that is done, it will give an insight into the expected activity parameter of pulsars without glitches.

Though hundreds of glitches have been observed across the population of neutron stars (see, for example Chukwude & Urama 2010; Espinoza et al. 2011; Yu et al. 2013; Lower et al. 2021; Basu et al. 2022; Li et al. 2023), the number of pulsars with records of a glitch is still very small compared to the number of known pulsars.[4] Large glitches $\Delta\nu/\nu \gtrsim 10^{-7}$ are often characterized by spectacular step changes in spin frequency (ν), usually accompanied by a change in frequency derivative ($\dot{\nu}$) (Antonelli et al. 2023a). It is known that glitches are not due to sudden changes in the external electromagnetic torques on the neutron star (Ruderman 1969; Anderson & Itoh 1975; Haskell & Melatos 2015). Therefore, glitch models are built on the neutron star crust quake mechanism or the neutron star interior superfluid vortex distribution and angular momentum transfer within the neutron star (Ruderman 1969; Anderson & Itoh 1975; Alpar et al. 1984; Zhou et al. 2014; Eya et al. 2017a, 2020). There has been no lack of theories to explain pulsar glitch trigger mechanisms and subsequent post-glitch behavior (see, for example, Baym et al. 1969; Baym & Pines 1971; Alpar 1995; Xiao et al. 2011; Zhou et al. 2014; Lai & Xu 2016; Eya et al. 2020; Rencoret et al. 2021, and for reviews (Haskell & Melatos 2015; Eya et al. 2020;

[4] One can see the ATNF pulsar catalog for number of known pulsars https://www.atnf.csiro.au/research/pulsar/psrcat.

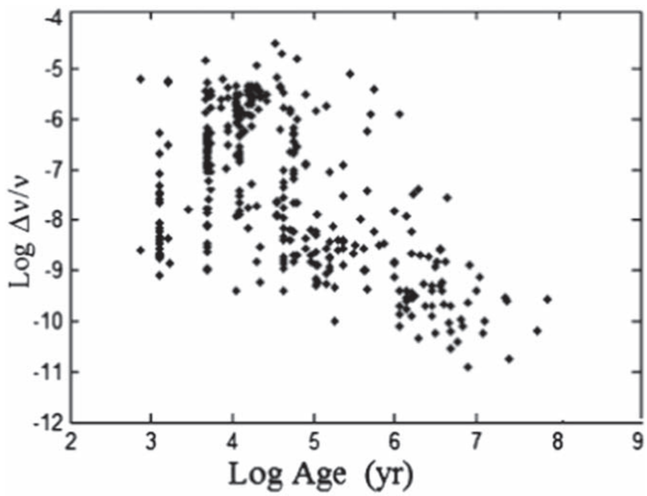

Figure 1. The distribution of glitch sizes with age.

Antonopoulou et al. 2022; Zhou et al. 2022)). Despite that, there has not been a consensus on the actual origin of glitches in neutron stars.

Many analysts have focused on the statistical study of glitch events either in individual pulsars or in ensembles of pulsars (e.g., Lyne et al. 2000; Melatos et al. 2008; Espinoza et al. 2011; Eya et al. 2014; Fuentes et al. 2017; Eya et al. 2019b, 2022). One of the major findings of this approach that has stood the test of time, and which stands alone in the field, is that the number, frequency, and size of glitches decrease as a pulsar ages (Eya et al. 2017b; Basu et al. 2022; Eya et al. 2022, and as also shown in Figure 1). In that, it could be said that the trigger of glitches in pulsars is age-dependent. This notion favors the glitch mechanism that hinges on neutron star interior superfluid vortex dynamics and transfer of angular momentum (e.g., Alpar et al. 1981, 1984; Eya et al. 2017a). Pulsars do not rotate as a rigid body. Instead, the crust rotates at a different speed than the interior superfluid, which creates a rotation lag between the two (Anderson & Itoh 1975; Alpar et al. 1981, 1984; Eya et al. 2017a). This lag allows angular momentum to be stored in the superfluid, carried by vortices. As the pulsar spins down, the magnitude of the rotation lag increases. Eventually, the vortices can no longer withstand the stored momentum, causing them to unpin, migrate, and transfer angular momentum to the crust, resulting in a spin-up phenomenon known as a glitch. After a glitch, the vortices gradually repin. The repining characterizes the relaxation of pulsars after glitch known as glitch recovery (Yu et al. 2013). Young pulsars with higher spin-down rates are more susceptible to glitches due to the larger rotation lag. Additionally, the interiors of younger pulsars are believed to be hotter, and vortex dynamics are highly temperature-dependent (Alpar et al. 1989). Thus, due to the turbulent conditions found in hot environments, combined with the high rate at which young pulsars slow down, vortex pinning and unpinning occur more frequently in younger pulsars. This can result in more instances of glitch events compared to older pulsars. As the pulsar ages and its spin-down rate decreases, the likelihood of glitches also decreases (Haskell & Melatos 2015; Eya et al. 2017a). The pulsar characteristic age ($\tau_c = \frac{\nu}{-2\dot{\nu}}$), which is somewhat a quotient of the pulsar spin frequency and the frequency derivative, is the spin-down time of a given pulsar from birth believing that pulsars behave like a dipole rotator in a vacuum. The frequency and the frequency derivative are the primary parameters altered in glitches. Characterizing the alterations in them is a major way of studying glitch events in pulsars. As we proceed, in Section (3) we shall see how glitches are also distributed in the plane of the spin frequency and its derivative. This will help in visualizing the spin parameter that will be reliable enough in estimating the pulsar's glitch activities.

Another vital product of statistical analysis of glitch events is the "activity parameter" (McKenna & Lyne 1990). In a statistical study of 48 glitches from 18 pulsars, Lyne et al. (2000) found that the activity parameter is directly proportional to the pulsar frequency derivative. Wang et al. (2000), from an analysis of 76 glitches from 25 pulsars, found that there is no consistent relationship between glitch magnitude and the time since the previous glitch or the time to the following glitch, either for the ensemble or for individual pulsars. As such, drivers of glitch activity must be external to the pulsars, thereby being in line with what Lyne et al. (2000) reported. This finding of Wang et al. (2000) is buttressed by that of Eya et al. (2019b) who showed that there is no significant difference between inter-glitch time interval following large glitches and that of small glitches. In that, the drivers of glitches are tied to a parameter, which is time-dependent and the plausible parameter is the $\dot{\nu}$. In the earliest study that estimated the activity parameters of pulsars, Urama & Okeke (1999) studied 71 glitches from 30 pulsars. They showed that for middle-age pulsars ($\tau_c \sim 10^4$–10^5 yr), the glitch activity parameter is proportional to the logarithm of the frequency derivative, $|\dot{\nu}|$. Based on the proportionality, they were able to estimate the glitch activity, a_g, for all the sampled youthful pulsars as: $a_g \approx 41.4 + 3.22 \text{ Log } |\dot{\nu}|$. The glitches studied in these cases above have magnitudes ($\Delta\nu/\nu \sim 10^{-6}$–$10^{-9}$) and represent $\sim$10% of glitches reported to date. As more glitches are being detected in the conventional radio pulsars and other manifestations of neutron stars, the range of glitch size has widened ($\Delta\nu/\nu \sim 10^{-5}$–$10^{-11}$), therefore, there is the need to re-examine the relationship between the glitch activity and the pulsar parameters altered in glitches.

Meanwhile, Fuentes et al. (2017) in a study of 348 glitches in the rotation of 141 neutron stars, using the approach of integrated glitch activity[5] and laying emphasis on the absolute glitch spin-up size ($\Delta\nu$), noted that the glitch activity correlates with spin frequency ν, and its derivative $|\dot{\nu}|$. Also, they noted

[5] That is a collective glitch activity for collections of pulsars sharing a common property.

that the activity parameter also correlates with parameters, which are a combination of ν and $\dot{\nu}$ such as characteristic age and spin-down luminosity, but not with magnetic field. In their analysis, pulsars were grouped with respect to their spin parameters and their glitch activity was estimated. As such, the result is based on averaging over objects of similar spin properties.

In this analysis, we shall focus on individual pulsars in quantifying the activity parameter. We will work with both the absolute ($\Delta\nu$) and fractional glitch sizes ($\Delta\nu/\nu$). The activity parameter—spin parameter relationship shall be explored to obtain a suitable equation for estimating the activity parameters of a given pulsar. The estimated activity parameter shall be tested for consistency with the already-known relationship between the activity parameter and pulsar spin parameters.

2. Data

The pulsar spin parameters are from Manchester et al. (2005) and updated with the Australia Telescope National Facility (ATNF)[6] pulsar catalog and references therein. We selected all the pulsars from the ATNF pulsar catalog that possess both ν and $\dot{\nu}$ measurements, that are not recycled/millisecond pulsars, not in a binary system or accreting matter from its environment. This results in a total of 2215 pulsars and 21 magnetar/anomalous X-ray pulsars (AXPs). However, it is important to note that our analysis is focused on pulsars and not magnetar/AXPs.

The glitch parameters are from Espinoza et al. (2011), Basu et al. (2022) and updated with the Jodrell Bank Observatory pulsar glitches[7] and references therein. For a large compilation of $\Delta\nu$, one can readily access http://www.jb.man.ac.uk/pulsar/glitches/original.html. The 670 glitches reported as of the time of this analysis came from 208 neutron stars, representing ~7% of the neutron star population (see footnote 6). About a third of these glitches came from just eight pulsars: PSRs J0534+2200 (Crab Pulsar)—30 glitches, J0537−6910–53 glitches, J0631+1036–17 glitches, J0835−4510 (Vela Pulsar)–24 glitches, J1341−6220–35 glitches, J1413-6141–14 glitches, J1740−3015–36 glitches, and J1801+2304–15 glitches. Most of the glitching pulsars (nearly two-thirds of them) have a record of just one glitch each. This few number of glitches per pulsar seriously limits the number of pulsars available for statistical analysis. For a sample to ascertain the relationship between the activity parameters and the spin parameters, we selected pulsars that have undergone at least five (5) glitches. There are a total of 31 pulsars in this group. These 31 pulsars account for half of the total number of observed glitches. Their characteristic ages, τ_c, are in the range of 1.26×10^3 to $\sim 1.38 \times 10^6$ yr.

[6] https://www.atnf.csiro.au/research/pulsar/psrcat

[7] http://www.jb.man.ac.uk/pulsar/glitches/original.html and http://www.jb.man.ac.uk/pulsar/glitches.html.

3. Distribution of Glitches Across Pulsar's Spin Parameters Altered in Glitches

It is worth noting that glitches in pulsars are seen in their spin frequency and frequency derivative. These parameters are those that are primarily altered in glitches. In that, processes culminating in glitches could be connected to them. To investigate whether the presence or absence of a glitch in a given pulsar is biased by the magnitude of its spin frequency or the derivative, distributions of the pulsars spin frequency and those of the spin-down rate are examined concerning pulsars with glitches and those without glitches. This is shown in Figure 2. The shaded histograms are for objects with records of glitches, whereas the unshaded are for objects without[8] a record of glitch event.

Upon examining the top panel (horizontally), it can be observed that there is no significant difference in the spin frequency magnitude between pulsars that have experienced glitch events and those that have not. The range of spin frequencies for pulsars with glitches is merely a subset of the range of spin frequencies for pulsars without glitches. The majority of pulsars with glitches have their spin frequency in the range of Log ν (1–10) Hz centered at ~Log $\nu = 0.5$, while there is also a large concentration of pulsars without glitches in that range. It should be pointed out that if a glitch event is solely dependent on pulsars' spin frequency, pulsars of this spin frequency range are potential glitch candidates. As such, one can extrapolate findings obtained in pulsars with glitches compared to those without. In the bottom panel (Figure 2), it appears that the distribution of pulsars with glitches is skewed with respect to the distribution of those without glitches. The proportion of pulsars with glitches to those without glitches concerning the bin size decreases with decreasing frequency derivative. This shows that a pulsar with a high frequency derivative is more prone to glitches than one with a lesser value. If one is to compare this with that of the spin frequency, it should be pointed out that the trigger of glitches could be external to the pulsars as the frequency derivative is a function of external torque on the pulsars. As such, pulsars with high-frequency derivatives are likely to glitch compared to pulsars with lower-frequency derivatives. This is in line with most glitch mechanisms, which hinge on the spinning down of pulsars. Pulsar spin-down is a prime contributor to processes that culminate in glitches.

To investigate how pulsars with glitches and those without glitches are distributed simultaneously in the plane of spin frequency ($\nu = P^{-1}$) and its derivatives, we explore the period (P)—period derivative ($\dot{P}$) diagram. The P–$\dot{P}$ diagram is a powerful tool to examine the evolution of pulsars at a glance. The diagram is shown in Figure 3. From it, at a glance, it is seen that recorded glitch events are mostly from pulsars of

[8] Note: many of these pulsars might have glitched but were not observed.

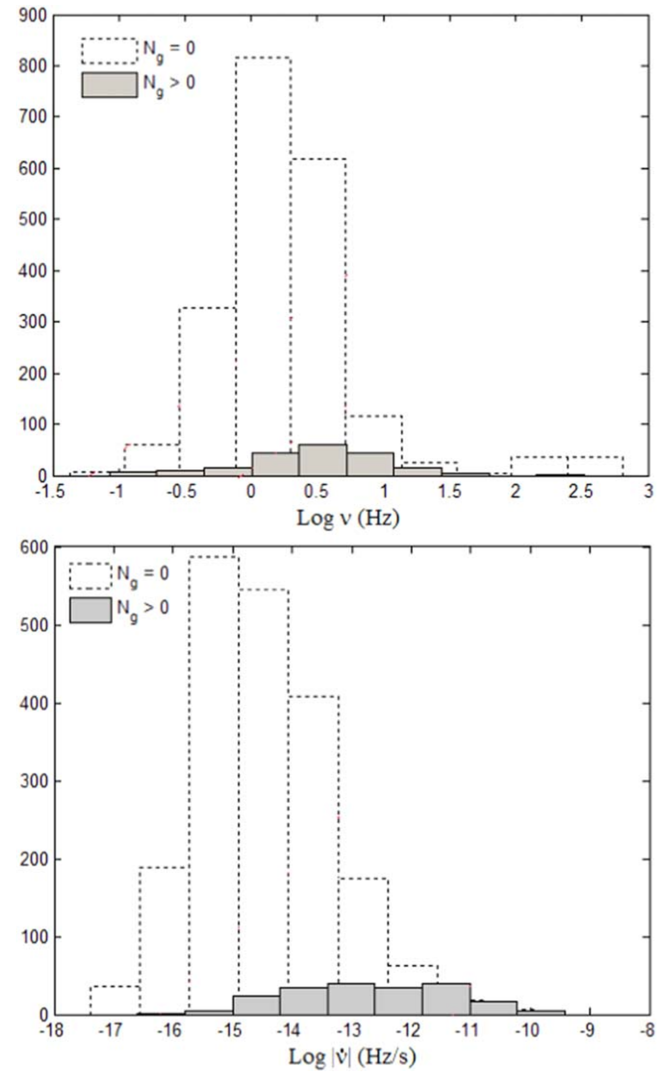

Figure 2. Top panel: distribution of pulsar spin frequency. Bottom panel distribution of pulsar frequency derivative. N_g denotes number of glitches.

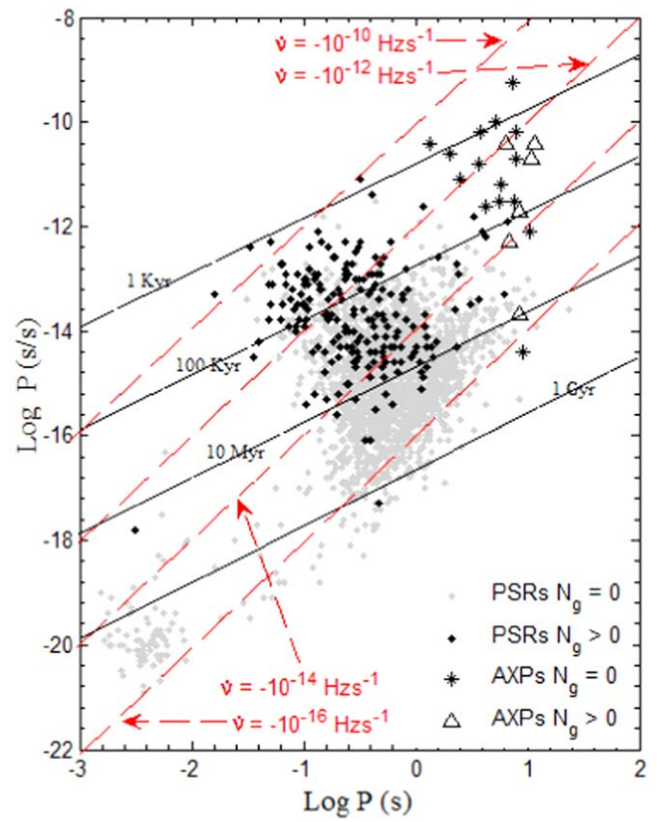

Figure 3. The period–period derivative diagram. The black solid line is a line of constant characteristic age (spin-down time). The dashed red lines are lines of constant frequency derivative. The horizontal axis is ν^{-1}.

$\tau_c < 10\,\mathrm{Myr}$ and $\dot{\nu} > -10^{-14}\,\mathrm{Hz\,s^{-1}}$. All pulsars of $\dot{\nu} \geqslant -10^{-10}\,\mathrm{Hz\,s^{-1}}$ have a recorded glitch, though there are very few pulsars in this category. Equally, if one moves down perpendicularly across the lines of constant $\dot{\nu}$, the ratio of pulsars with glitches to those without glitches decreases. This observation is another indication that glitch events are tied to the magnitude of the pulsar frequency derivative. That is, younger pulsars with high-frequency derivatives have shown more glitch events than older pulsars with low-frequency derivatives.

4. The Glitch Activity Parameter

The glitch activity parameter describes the rate and size of glitches in a given pulsar. It measures the frequency and size of glitches that occur in pulsar rotation for a given period. It is often defined as the mean fractional increase in rotation frequency per year due to a glitch or number of glitches per unit time (McKenna & Lyne 1990; Urama & Okeke 1999). In a pulsar with multiple glitches, the ith spin-up sequence is readily characterized with $(t_i, \Delta\nu_i)$ or $(t_i, \frac{\Delta\nu_i}{\nu})$ where t_i is the inter-glitch time interval of the ith glitch, while $\Delta\nu_i$ and $\frac{\Delta\nu_i}{\nu}$ are the absolute and fractional glitch size for t_i glitch respectively. Following Dib et al. (2008), the absolute glitch activity parameter, A_g, is defined as

$$A_g = \frac{1}{\Delta t_g}\sum_{i=1}^{N_g}\Delta\nu_i, \tag{1}$$

where Δt_g is the total time over which the glitches were observed and the sum is over all glitches; while the fractional glitch activity, a_g, is

$$a_g = \frac{1}{\Delta t_g}\sum_{i=1}^{N_g}\frac{\Delta\nu_i}{\nu}. \tag{2}$$

In these definitions, it is assumed that the statistical properties of the sequence $(t_i, \Delta\nu_i)$ remain constant regardless of the observation window. However, this may not always be the case when the observation time is unknown (or irregular observation), and only the sequence (t_i, $\Delta\nu_i$) is available. To address this and in order not to overestimate the activity parameters, a qualitative modification has been made (Montoli et al. 2021; Antonelli et al. 2023b) resulting in

$$A_g \approx \frac{N_g - 1}{N_g(t_{N_g} - t_1)} \sum_{i=1}^{N_g} \Delta\nu_i, \tag{3}$$

and as such,

$$a_g \approx \frac{N_g - 1}{N_g(t_{N_g} - t_1)} \sum_{i=1}^{N_g} \frac{\Delta\nu_i}{\nu}. \tag{4}$$

N_g is the number of glitches, and t is the time of the glitch.

In this analysis, we adopted the use of Equations (3) and (4) in estimating the glitch activity parameters. The spin parameters and the activity parameters of the sampled pulsars are presented in Table 1. As in Table 1 and as also seen in other analyses (for example see Urama & Okeke 1999; Lyne et al. 2000; Espinoza et al. 2011; Eya et al. 2022), the magnitude of the activity parameter in a given pulsar is mainly dominated by the number of large glitches ($\Delta\nu/\nu > 10^{-7}$) in such a pulsar at that period. This is because the addition of let us say glitch sizes of $\Delta\nu/\nu > 10^{-9}$ to $\Delta\nu/\nu > 10^{-7}$ will require up to hundreds of such small glitches to effectively alter the magnitude of $\Delta\nu/\nu > 10^{-7}$. As such, the magnitude of glitch activity to an extent is just a measure of the preponderance of large glitches in a given pulsar. In addition, we have to note that the magnitude of activity parameters in individual pulsars has not been a constant value. It varies from analysis to analysis, though revolves around a narrow range with minimal dispersion in pulsars with regular and similarly sized glitches. The variations are mainly due to an unequal observational time span and an unequal number of large glitches involved.

As the glitch events alter[9] the pulsar's spin frequency and its derivatives, and the event rate depends on the pulsar characteristic age, these parameters are likely tools in studying the activity parameters. In what follows, we probe the relationship between the activity parameters and these pulsar spin parameters. To do this, we start by plotting the parameters. The plots are shown in Figure 4. From the pattern of the data points in the logarithm plots [see Figures 4(A, B, D and E)], two physical functions can be used to describe the relationships: one is linear and the other is of a polynomial of second order (quadratic). The relationship with characteristic age is just linear [as seen in Figures 4(C and F)]. The summary of the statistical parameters of the fits is presented in Table 2. The correlation coefficient is denoted by the symbol r, while the coefficient of determination is denoted by R^2. The norm of residuals is denoted by $n_{\rm res}$.

[9] The alteration could be permanent or transient.

The coefficient of determination, R^2, is a statistical measure that indicates the percentage of the variance in the dependent variable that can be explained by the independent variables. In simpler terms, it shows how well a model fits a given data set. A higher R^2 indicates a better fit. In this context, it shall determine the percentage of the activity parameter that can be determined from the pulsar spin parameters. However, it is always recommended to use this metric in combination with other diagnostic tools and domain knowledge to have an informed understanding of the model's performance and reliability. Therefore, it is important to also examine the norm of residuals, to determine the quality of the fits.

The norm of residuals is a statistical measure that calculates the differences between the observed values and the values predicted by a statistical model. It represents the differences between the actual data points and the corresponding values predicted by the model. In order to select the best model that fits the data, the norm of residuals is used as a criterion for comparison between different models. A lower norm of residuals typically suggests a better fit. By analyzing both R^2 and $n_{\rm res}$, we can assess the goodness of fit of the models and make better decisions.

In Figure 4(A), the correlation coefficients (see Table 2) suggest a moderate correlation between the a_g and ν. An increase in ν is positively associated with increases in a_g. However, the magnitude of R^2 in both fits (<0.5) indicates that the pulsar spin frequency could not account for up to 50% of the variance in the a_g that is explained by the pulsar spin frequency. Nonetheless, the two possible relationships envisaged from Figure 4(A) are described by equations of the form

$$\text{Log } a_g \simeq -0.539(\text{Log } \nu)^2 + 1.663\,(\text{Log } \nu) - 0.296, \tag{5}$$

for the quadratic nature, while the linear nature takes the form

$$\text{Log } a_g \simeq 0.989(\text{Log } \nu) - 0.251. \tag{6}$$

In Figure 4(B) the $r = 0.85$ indicates a very strong relationship between the a_g, and $|\dot{\nu}|$ in a quadratic model and a strong relationship ($r = 0.67$) in the linear model. The relationships are described by equations of the forms

$$\text{Log } a_g \simeq -0.2067(\text{Log } |\dot{\nu}|)^2 - 4.239\,(\text{Log } |\dot{\nu}|) - 20.79, \tag{7}$$

for the quadratic nature, and the linear nature is

$$\text{Log } a_g \simeq 0.5196(\text{Log } |\dot{\nu}|) + 6.2453. \tag{8}$$

The value of R^2, which is 0.72 in the quadratic nature, indicates that about 70% of a_g relies on the pulsar spin frequency derivative. In contrast, the linear nature has an R^2 value of 0.42, which means that only about 40% of the variance of a_g can be explained by $|\dot{\nu}|$ in the linear model. This suggests that the model's deviation from the observed data could go up to 60%. Moreover, the norm of residuals shows a difference of an order of magnitude between the two models (refer to Table 2) with that of

Table 1
Table Showing the Spin Parameters and the Observed Activity Parameter of the Sampled Pulsars

Pulsar J Name	ν (Hz)	$\lvert\dot{\nu}\rvert$ (10^{-12} Hz s^{-1})	τ_c (kyr)	N_g	N_L	a_g (10^{-7} yr^{-1})	A_g (10^{-7} Hz yr^{-1})
0205+6449	15.22	44.87	5.37	9	7	7.18	109.30
0534+2200	29.95	377.54	1.26	30	2	0.21	6.40
0537-6910	62.03	199.23	4.93	53	46	6.57	407.64
0631+1036	3.47	1.26	43.6	17	2	2.20	7.63
0729-1448	3.97	1.79	35.2	6	1	3.29	13.05
0742-2822	6.00	0.60	157	9	1	1.17	7.03
0835-4510	11.19	15.67	11.3	24	20	7.32	81.89
1016-5857	9.31	7.01	21	5	4	6.21	57.79
1023-5746	8.97	30.88	4.6	7	6	14.84	133.11
1048-5832	8.08	6.28	20.4	6	3	4.77	38.54
1105-6107	15.82	3.97	63.2	5	3	1.34	21.17
1341-6220	5.17	6.77	12.1	35	20	7.14	36.94
1357-6429	6.02	13.05	7.31	5	0	6.30	37.96
1413-6141	3.50	4.09	13.6	14	10	4.84	16.94
1420-6048	14.67	17.89	13	7	7	5.52	80.89
1617-5055	14.42	28.09	8.13	6	3	1.03	14.79
1709-4429	9.76	8.86	17.5	5	5	2.77	26.99
1731-4744	1.21	0.24	80.4	6	3	1.11	1.34
1740-3015	1.65	1.27	20.6	36	11	3.09	5.09
1801-2304	2.40	0.65	58.3	15	6	2.38	5.72
1801-2451	8.00	8.20	15.5	7	6	5.09	40.74
1803-2137	7.48	7.52	15.8	6	4	5.95	44.53
1814-1744	0.25	0.05	84.6	7	0	0.07	0.02
1825-0935	1.30	0.09	233	7	1	0.06	0.08
1826-1334	9.85	7.31	21.4	7	5	3.64	35.90
1841-0524	2.24	1.18	30.2	7	4	1.44	3.23
1902+0615	1.48	0.02	1380	6	0	0.00	0.00
1952+3252	25.30	3.74	107	6	0	1.36	34.36
2021+3651	9.64	8.89	17.2	5	5	4.75	45.79
2225+6535	1.47	0.02	1120	5	1	0.45	0.65
2229+6114	19.37	29.37	10.5	9	7	2.69	52.15

Note. N_g denotes the number of observed glitches, and N_L denotes the number of large glitches ($\Delta\nu/\nu \gtrsim 10^{-7}$).

the quadratic being the lesser one. This demonstrates that the quadratic nature model fits the observed a_g better than the linear nature model. In Figure 4(C), the relationship has the form

$$\text{Log } a_g \simeq -0.8298(\text{Log } \tau_c) + 3.9710. \quad (9)$$

The value of a_g is inversely proportional to τ_c, with a correlation coefficient of $r = -0.65$. This indicates a strong inverse relationship between the two variables, and the coefficient of determination R^2 is equal to 0.42. This means that only around 40% of the variability in a_g can be explained by τ_c, suggesting that around 60% of the information on the activity parameter could be lost if one relies solely on pulsar characteristic age in estimating the glitch activity parameter. In examining the inverse relationship between a_g and τ_c and the consistency of this result with the linear nature of Figure 4(B), it is worth noting that $\tau_c \approx -\nu/2\dot{\nu}$. The inverse[10] relationship and the consistency indicate that the effects of $\lvert\dot{\nu}\rvert$ on the activity parameter are more pronounced than those of ν. Therefore, $\lvert\dot{\nu}\rvert$ is a better indicator of the occurrence of glitch events in pulsars.

On the other hand, the absolute glitch activity—pulsar spin parameter relationship appears to be tighter than that fractional glitch activity relationship (as seen in Table 2). With the pulsar spin frequency, the relationships are as follows: In Figure 4(D)

$$\text{Log } A_g \simeq -0.539(\text{Log } \nu)^2 + 2.663\,(\text{Log } \nu) - 0.296, \quad (10)$$

is for the quadratic nature, while

$$\text{Log } A_g \simeq 1.989(\text{Log } \nu) - 0.251 \quad (11)$$

is for the linear nature. Unlike Figure 4(A), A_g exhibits a strong relationship with ν. In both natures, ν could account for up to 60% of A_g as demonstrated by the magnitude of R^2 (see Table 2). In Figure 4(E), the relationship is of the form

$$\text{Log } A_g \simeq -0.187(\text{Log } \lvert\dot{\nu}\rvert)^2 - 3.360\,(\text{Log } \lvert\dot{\nu}\rvert) - 12.554, \quad (12)$$

[10] consequence of $\dot{\nu}$ being in the denominator.

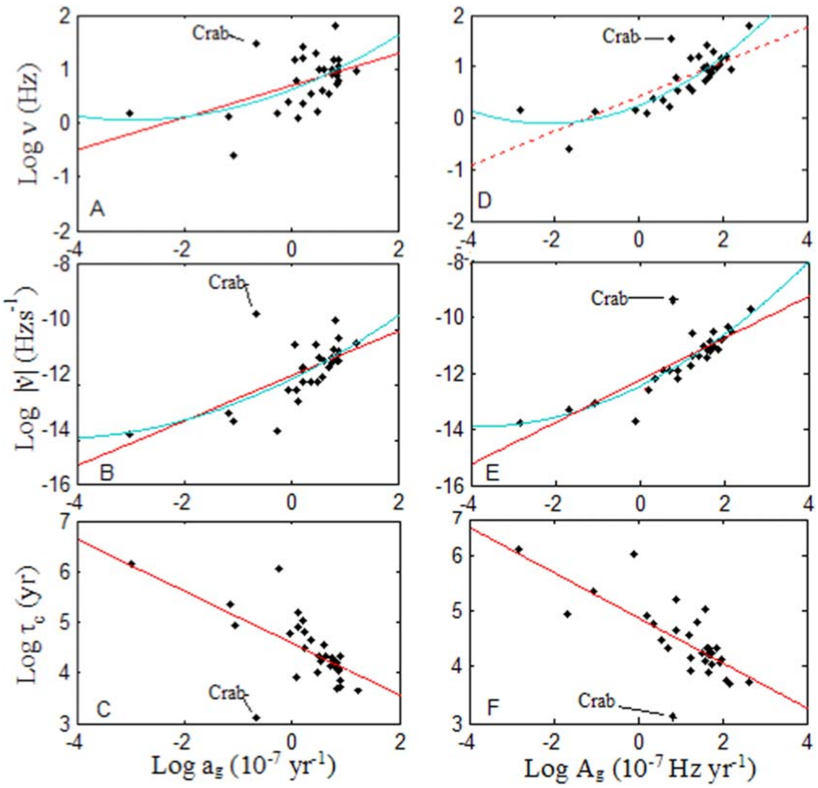

Figure 4. Plots of the pulsar spin parameters, ν, $|\dot{\nu}|$ and τ_c with both the fractional glitch activity (a_g) and the absolute glitch activity (A_g).

Table 2
Summary of the Statistical Parameters of the Fits in Figure 4

Figure	Fits	r	R^2	$n_{\rm res}$
4(A) $(a_g-\nu)$	quadratic	0.58	0.34	3.732
	linear	0.50	0.25	3.974
4(B) $(a_g-\lvert\dot{\nu}\rvert)$	quadratic	0.85	0.72	2.440
	linear	0.67	0.42	3.484
4(C) $(a_g-\tau_c)$	linear	−0.65	0.43	3.468
4(D) $(A_g-\nu)$	quadratic	0.81	0.66	3.732
	linear	0.78	0.61	3.974
4(E) $(A_g-\lvert\dot{\nu}\rvert)$	quadratic	0.91	0.83	2.163
	linear	0.83	0.70	3.503
4(F) $(A_g-\tau_c)$	linear	−0.73	0.54	4.351

Note. $n_{\rm res}$ denotes norm of residuals.

for the quadratic nature, while the linear nature is

$$\mathrm{Log}\, A_g \simeq 1.0939(\mathrm{Log}\, |\dot{\nu}|) + 13.683. \quad (13)$$

The magnitude of r and R^2 indicate a very strong relationship between the parameters (see Table 2). This is consistent with the findings in Figure 4(B) but with an even stronger correlation. This emphasizes the significance of $|\dot{\nu}|$ in determining the glitch activity of pulsars. It shows that in modeling the glitch activity of pulsars without records of glitch events, spin frequency derivative should be the first and foremost parameter to consider. Moreover, the quadratic nature of the relationship with $R^2 = 0.83$ and the least $n_{\rm res}$ suggest that the best-fitted model between the activity parameter and the spin parameters is the quadratic model. We shall examine this finding further as we proceed. Finally, the A_g relationship with τ_c (Figure 4(F)) is linear and inverse. It has an equation of the form

$$\mathrm{Log}\, A_g \simeq -1.3011(\mathrm{Log}\, \tau_c) + 6.8376. \quad (14)$$

Meanwhile, it is worth noting that the data point of the Crab pulsar deviates significantly from the trends defined by data points of other pulsars. On isolating the Crab pulsar and evaluating the correlation coefficients, the magnitude rose by 5%. We suggest this observation to be a consequence of the preponderance of small-sized glitches in the Crab pulsar. This could indicate that how the activity parameter of the Crab pulsar relates to its spin parameters is different from others or that the glitch mechanism in the Crab pulsar is different from others.

Table 3
Table Showing the Activity Parameter Estimated from the Pulsar Spin Frequency (ν)

Pulsar J Name	a_g (quad)	a_g (linear)	A_g (quad)	A_g (linear)
0205+6449	8.26	8.29	125.62	126.08
0534+2200	9.65	16.18	288.88	484.69
0537-6910	8.98	33.25	556.73	2062.68
0631+1036	2.79	1.92	9.70	6.68
0729-1448	3.21	2.20	12.77	8.73
0742-2822	4.69	3.30	28.14	19.78
0835-4510	7.17	6.12	80.24	68.47
1016-5857	6.45	5.10	60.04	47.47
1023-5746	6.30	4.91	56.50	44.07
1048-5832	5.88	4.43	47.52	35.82
1105-6107	8.38	8.61	132.57	136.25
1341-6220	4.13	2.85	21.38	14.74
1357-6429	4.71	3.31	28.35	19.94
1413-6141	2.81	1.94	9.85	6.78
1420-6048	8.14	7.99	119.33	117.18
1617-5055	8.08	7.86	116.48	113.26
1709-4429	6.63	5.34	64.75	52.12
1731-4744	0.68	0.67	0.82	0.81
1740-3015	1.09	0.92	1.80	1.51
1801-2304	1.82	1.34	4.37	3.21
1801-2451	5.84	4.39	46.75	35.14
1803-2137	5.57	4.11	41.66	30.71
1814-1744	0.03	0.14	0.01	0.04
1825-0935	0.77	0.73	1.00	0.95
1826-1334	6.67	5.39	65.74	53.12
1841-0524	1.66	1.25	3.73	2.80
1902+0615	0.94	0.83	1.40	1.23
1952+3252	9.47	13.70	239.49	346.49
2021+3651	6.58	5.28	63.47	50.85
2225+6535	0.92	0.82	1.35	1.20
2229+6114	8.94	10.52	173.26	203.77

Note. Columns for quadratic nature are headed with (quad) while those for linear nature are headed with (linear). A_g is in unit of 10^{-7} Hz yr^{-1} while a_g is in unit of 10^{-7} yr^{-1}.

Table 4
Table Showing the Activity Parameter Estimated from the Pulsar Spin Frequency Derivative ($|\dot{\nu}|$)

Pulsar J Name	a_g (quad)	a_g (linear)	A_g (quad)	A_g (linear)
0205+6449	8.74	7.38	155.26	230.24
0534+2200	6.32	22.32	318.42	2366.96
0537–6910	7.59	16.02	277.33	1176.22
0631+1036	2.42	1.16	8.93	4.64
0729–1448	3.04	1.38	12.91	6.78
0742–2822	1.40	0.79	3.83	2.07
0835–4510	7.60	4.27	82.96	72.83
1016–5857	5.97	2.81	45.52	30.21
1023–5746	8.51	6.08	126.88	153.02
1048–5832	5.72	2.66	41.59	26.79
1105–6107	4.69	2.09	27.93	16.21
1341–6220	5.89	2.76	44.25	29.09
1357–6429	7.26	3.89	73.07	59.65
1413–6141	4.76	2.13	28.69	16.75
1420–6048	7.82	4.58	90.69	84.21
1617–5055	8.41	5.79	120.11	137.95
1709–4429	6.48	3.18	54.80	39.03
1731–4744	0.61	0.48	1.15	0.75
1740–3015	2.43	1.16	8.94	4.64
1801–2304	1.49	0.82	4.20	2.25
1801–2451	6.31	3.05	51.58	35.85
1803–2137	6.12	2.92	48.17	32.63
1814–1744	0.10	0.21	0.10	0.13
1825–0935	0.21	0.29	0.28	0.25
1826–1334	6.06	2.87	47.07	31.61
1841–0524	2.31	1.11	8.25	4.29
1902+0615	0.02	0.12	0.02	0.04
1952+3252	4.56	2.03	26.48	15.20
2021+3651	6.49	3.18	54.97	39.20
2225+6535	0.03	0.14	0.03	0.05
2229+6114	8.46	5.92	123.27	144.84

Note. Columns for quadratic nature are headed with (quad) while those for linear nature are headed with (linear). A_g is in unit of 10^{-7} Hz yr^{-1} while a_g is in unit of 10^{-7} yr^{-1}.

5. Estimating the Activity Parameters of Pulsars with Multiple Glitches

Using Equations (5), (6), (10) and (11) the activity parameters of the sampled pulsars are calculated from the pulsar spin frequency. The values are presented in Table 3. Then utilizing Equations (7), (8), (12)) and (13), the activity parameters are calculated from the pulsar spin frequency derivatives, while Equations (9) and (14) are used to calculate the activity parameters from the pulsar characteristic age. The values are presented in Tables 4 and 5 respectively.

6. Comparing the Estimated Activity Parameters with the Observed

A monotonic comparison of the estimated activity parameters of the sampled pulsars with the observed is summarized in Table 6. In all the comparisons, a positive direct association is observed.

The highest correlation came from $|\dot{\nu}|_q$, though in all the comparisons, the correlation coefficients are significant at the 5% significance level. Next, we examine the similarity in data point distributions using two-dimensional Kolmogorov–Smirnov (K-S) test and the kernel density estimator plot. The K-S test helps to determine whether the distributions of the two quantities in question are similar and of the same continuous distribution, while the kernel density plot will present a picture of the similarity in the distributions' measure of central tendency. The kernel density approach has an advantage over the use of histograms in the sense that the final look of the plot does not depend on the choice of the class interval like the histogram (Heumann & Schomaker 2016) and the issue of lack of continuity that is sometimes posed by histograms is avoided. In addition, the kernel density estimator plot

Table 5
Table Showing the Activity Parameters Estimated from the Pulsar Characteristic age (τ_c)

Pulsar J Name	a_g (linear)	A_g (linear)
0205+6449	7.51	149.81
0534+2200	25.02	917.35
0537−6910	8.07	166.70
0631+1036	1.32	10.93
0729−1448	1.58	14.28
0742−2822	0.46	2.20
0835−4510	4.05	59.11
1016−5857	2.42	27.24
1023−5746	8.54	181.78
1048−5832	2.48	28.25
1105−6107	0.97	6.87
1341−6220	3.83	54.26
1357−6429	5.82	101.88
1413−6141	3.48	46.89
1420−6048	3.61	49.61
1617−5055	5.33	89.20
1709−4429	2.82	34.21
1731−4744	0.80	5.09
1740−3015	2.46	27.90
1801−2304	1.04	7.60
1801−2451	3.12	39.82
1803−2137	3.07	38.88
1814−1744	0.76	4.77
1825−0935	0.33	1.35
1826−1334	2.39	26.61
1841−0524	1.79	17.30
1902+0615	0.08	0.15
1952+3252	0.63	3.56
2021+3651	2.86	34.96
2225+6535	0.09	0.19
2229+6114	4.31	64.79

Note. Only linear fit is considered. A_g is in unit of 10^{-7} Hz yr^{-1} while a_g is in unit of 10^{-7} yr^{-1}.

provides a direct comparison between the width and peaks[11] of the distributions under investigation.

In the K-S test, the null hypothesis (i.e., $h = 0$) is that the two distributions in question are similar. Now, with regards to the distributions of the estimated and observed glitch activity, if the null hypothesis is true, it indicates that the estimated glitch activity is in high precision with the observed glitch activity. The alternative hypothesis (i.e., the null hypothesis is false. $h = 1$) is that the two distributions are significantly different. As such, the estimated glitch activity is not similar to the observed glitch activity. The P-value determines the reliability of the result (i.e., to ascertain if the null or alternative hypothesis is obtained by chance), and the K-value is just the maximum distance between the curves.[12] A large P-value is a key point to accept the null hypothesis, else otherwise. The test is done at the 5% significance level. The result is rejected outrightly for any $P \leqslant 0.05$.

Table 6
Summary of Correlation Coefficient (r) between the Estimated Activity Parameters and the Observed

Parameter Used	a_g r	A_g r
ν_q	0.57	0.81
ν_l	0.50	0.73
$\|\dot{\nu}\|_q$	0.80	0.90
$\|\dot{\nu}\|_l$	0.67	0.84
τ_c	0.50	0.73

Note. Subscripts q and l denote results from quadratic and linear natures respectively.

Table 7
Table Showing the K-S Test Results between the Observed and Estimated Glitch Activities from the Spin Parameters

Spin Parameter	a_g P	K	A_g P	K
ν_q	0.560	0.194	0.778	0.161
ν_l	0.778	0.161	0.559	0.193
$\|\dot{\nu}\|_q$	0.666	0.193	0.954	0.129
$\|\dot{\nu}\|_l$	0.778	0.161	0.778	0.161
τ_c	0.363	0.226	0.998	0.097

Note. $h = 0$ in all. Subscripts q and l denote results from quadratic and linear natures respectively.

The summary of the K-S test results is presented in Table 7, while the kernel density plot is shown in Figure 5. In the results, the null hypothesis is true in all (i.e., $h = 0$). This is an indication that the distributions of the observed and estimated activity parameters are similar (despite that the data point of the Crab pulsar foists an outlier), thereby supporting the result presented in Table 6. As such, each of the three spin parameters (i.e., ν, $|\dot{\nu}|$ and τ_c) could be used in estimating the glitch activity of pulsars. The magnitudes of the P-values also support that the null hypothesis is true not by chance.[13] When we juxtapose the result from the K-S test with the result in Table 6 and the magnitudes of the norm of residuals, we state that in estimating the activity parameters of pulsars, the best parameter to use is $|\dot{\nu}|$ and it is best described by Equations (7) and (12)—the quadratic nature.[14]

Moreover, the kernel density plots (Figure 5) also support the outcome of the K-S test that the null hypothesis is true in all cases. The widths are similar, and the peaks of the distributions

11 modal and mean values.
12 the values of both P and K range from 0 to 1.
13 the probability that the result is obtained by chance is (1—P).
14 note that parameters are in logarithm.

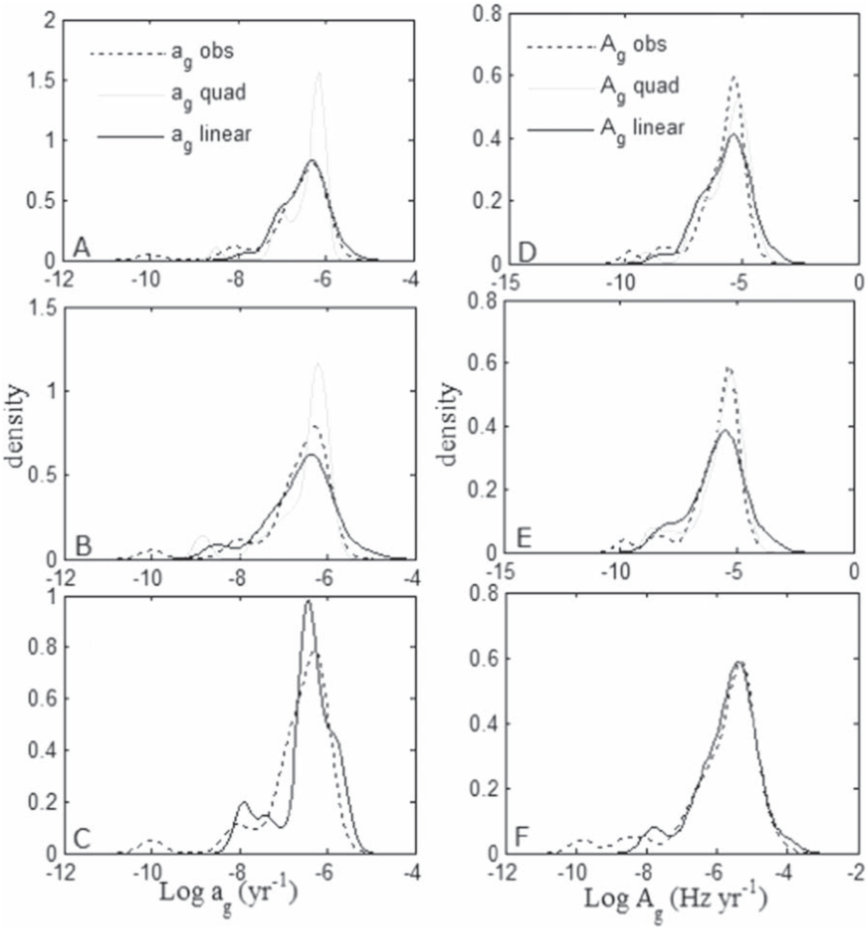

Figure 5. Kernel density of the distribution of observed and estimated glitch activities. Broken lines are for the observed values. The solid lines are for the estimated values: gray lines represent the quadratic nature, while black ones signify the linear nature.

are similarly valued. The difference in densities is just a consequence of an unequal number of events with the same value. This similarity in shape indicates that the compared distributions have similar measures of central tendency. Then, the behavior of each of the distributions in isolation can be extrapolated to the others, and a similar result obtained. From the A_g panel, the mean peak is -5.5, which corresponds to absolute glitch activity of $\sim 63.1 \times 10^{-7}$ Hz yr^{-1}, while from the a_g panel, the mean peak is -6.277, corresponding to fractional glitch activity of $\sim 5.28 \times 10^{-7}$ yr^{-1}. These values represent the value where the activity parameters are centered respectively.

Meanwhile, for emphasis, a look at panels (E) and (F) reveals the highest levels of agreement between the estimated activity parameter with the observed. In (E), it is between the quadratic nature and the observed, while in (F), it is between the linear nature and the observed. Knowing that τ_c is a function of $\dot{\nu}$, one can readily say that the observation in (F) is just an extrapolation from (E). As such, the prime driver of these agreements is $\dot{\nu}$ supporting the earlier choice made with the results of the K-S test concerning Equation (12).

7. Activity Parameters of Pulsars Without Records of Glitches

Now we have established that the quadratic nature of the activity parameters with respect to pulsar spin frequency derivative is good enough to calculate the activity parameters of pulsars with multiple glitches, and we proceed to estimate the activity parameters of pulsars without a record of glitches. The activity parameters of the 2215 pulsars selected from the ATNF pulsar catalog are calculated. They are presented in Appendix (Table A1).

To visualize how the activity parameters are distributed in the ensemble of pulsars, we examine the distribution of the activity parameters. The distribution plots are shown in Figure 6. The distributions approximate a normal distribution as demonstrated by the fits on the plots. This is an indication that the equation used in the estimation describes the activity parameters well. The activity parameter of pulsars with multiple glitches is just a subset of the distribution of activity parameters of the ensemble of pulsars as expected (see the shaded histograms). More so, it shows that the activity parameters we measure today from pulsars of multiple glitches correspond only to the larger end of the activity parameter distribution. The red vertical lines with arrows indicate the least observed activity parameter. The top panel corresponds to a cumulative fractional glitch size of $\Sigma\Delta\nu/\nu \sim 10^{-11}$ per year and the bottom panel corresponds to a cumulative absolute glitch size of $\Sigma\Delta\nu \sim 1.0 \times 10^{-8}$ Hz per year. Inevitably, glitches of these sizes are difficult to measure because of their indistinguishable nature from timing noises. So, pulsars of very low spin-down rate ($|\dot{\nu}| \leqslant 10^{-14}$) could be glitching with glitches of such sizes. When measurements of such small glitch sizes become feasible, the activity parameters of such pulsars shall be at the back end of the arrows. This is also in line with the note of Espinoza et al. (2011) who opined that the distribution of glitch sizes is incomplete at the small end of the glitch size distributions. In the future when glitch size distribution is complete, the distribution of the activity parameters will resemble that presented in Figure 6.

In what follows, we test the relationship between the estimated activity parameters with pulsar main parameters using the observed activity parameter as a control by plotting them together. The relationship is shown in Figure 7. In all the plots, the observed activity parameters fit well in the trend defined by the estimated activity parameters. This is a show of agreement between theoretical and observed activity parameters. The spin frequency has a weak correlation with the activity parameters (as seen in panels (A) and (F)). In this, we point out that in an ensemble of pulsars, ν does not have a strong relationship with activity parameters. With the spin frequency derivative (panels (B) and (G)) the relationship with the activity parameters is very strong. The glitch activity increases with an increase in frequency derivative just as earlier reported by some authors (e.g., Urama & Okeke 1999; Lyne et al. 2000; Fuentes et al. 2017; Eya et al. 2022). This finding is just another support to the notion that glitches are driven by pulsar spin-down rate. In panels (C) and (H), we can observe a strong inverse relationship between the activity parameters and the pulsar characteristic age, which is expected. This is because the characteristic age is partly determined by the spin frequency and its derivative, where the derivative is the denominator. As the activity parameters have a strong positive correlation with the frequency derivative, it can be seen that the effect of spin frequency on the activity parameter is minimal in the presence of a spin frequency derivative. This supports the idea that glitches are driven by spin-down rate, as older pulsars spin down less fast. Additionally, this inverse correlation is consistent with Figure 1, which shows that glitch size and number of events decrease with pulsar characteristic age. Panels (D) and (I) illustrate the relationship between the

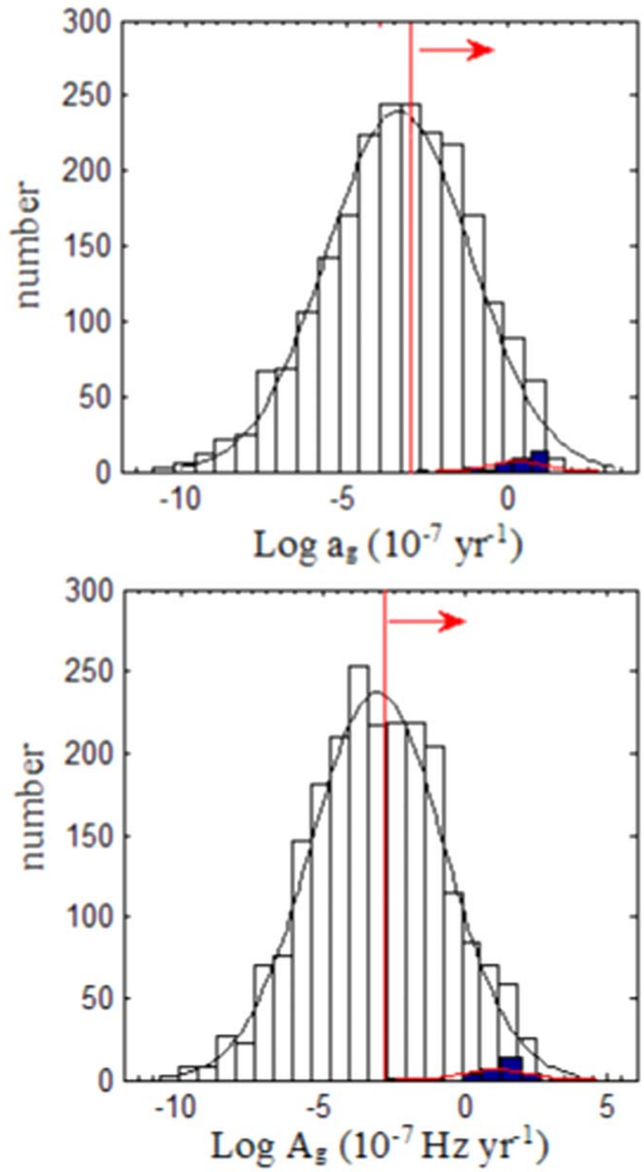

Figure 6. The distribution of glitch activity parameters in pulsars. The top panel is fractional glitch activity, while the bottom panel is absolute glitch activity. Shaded/colored histograms are pulsars with multiple glitches, while plain histograms are for all the pulsars. The red vertical lines indicate the least observed activity parameter.

pulsar's surface magnetic field ($\sim\sqrt{P\dot{P}}$) and the activity parameter. The correlation coefficient magnitude indicates that they exhibit a moderate relationship, which contradicts the report of Fuentes et al. (2017). To obtain a clear picture of the correlation, observing more glitches in pulsars without records of glitches is necessary. Panels (E) and (J) show a strong correlation between the spin-down luminosity and the activity parameters. This is an indication that the rate at which a pulsar loses rotational kinetic energy ($\sim I\dot{\nu}\nu$) influences the activity

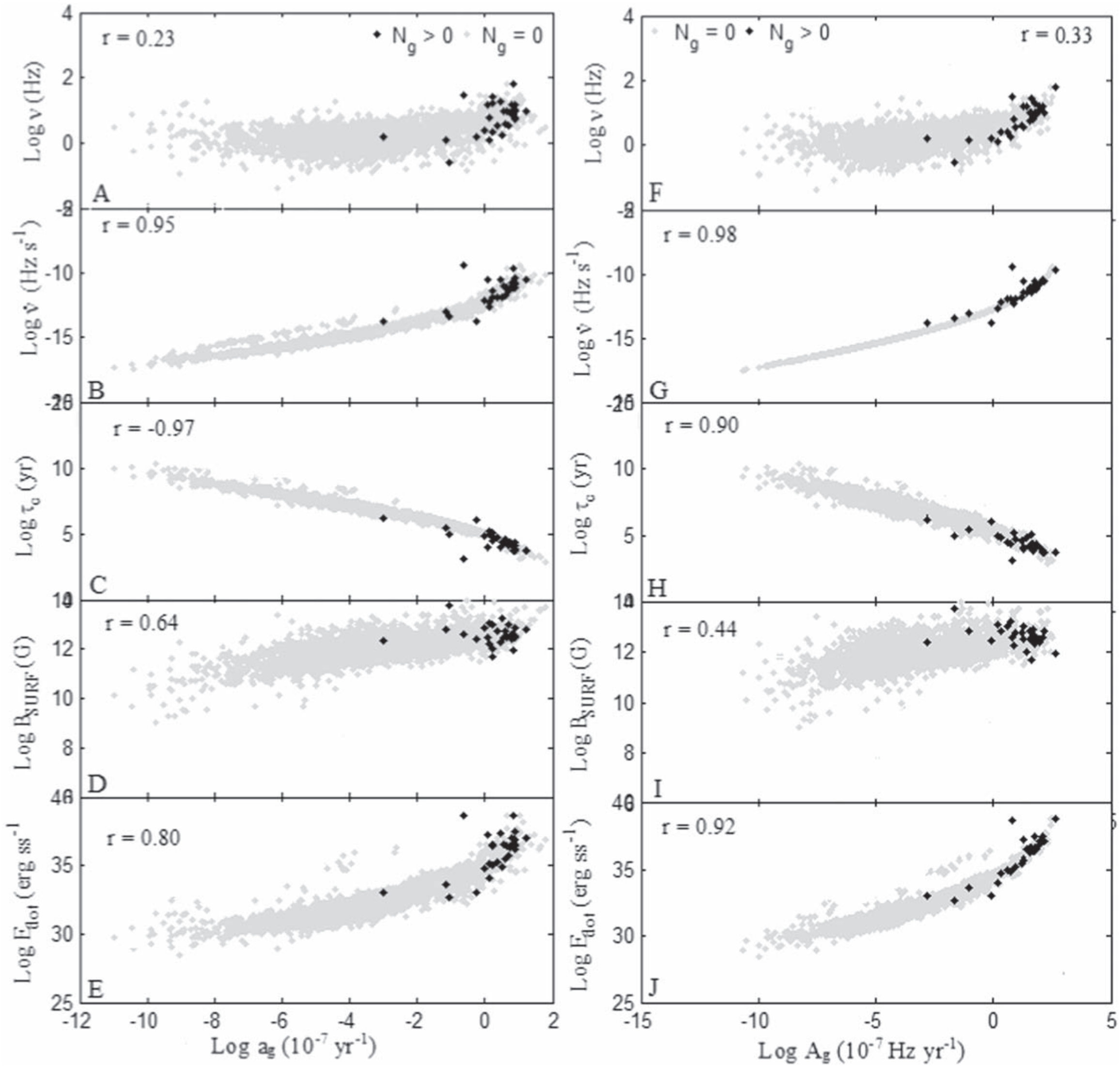

Figure 7. Activity parameter as a function of pulsar spin parameters. Panels: (A) and (F) are for spin frequency, (B) and (G) are for frequency derivatives, (C) and (H) are for characteristic age, (D) and (I) are for the surface magnetic field, and (E) and (J) are for spin-down luminosity. Black dots are for pulsars with multiple glitches, while gray dots are for all the pulsars. *r* denotes the correlation coefficient.

parameter. Indeed, parameters associated with frequency derivatives have a strong correlation with activity parameters, which highlights the importance of frequency derivatives in pulsar glitch events. The spin frequency derivative indicates the slowing down of a pulsar, and it is defined as $\dot{\nu} = -K\nu^n$, where n is the breaking index, and K is a positive constant that depends on the pulsar's magnetic field strength, moment of inertia (I), and the angle of inclination (α) between the rotation and magnetic axes. This equation is the standard spin-down law of pulsars. Assuming that pulsars spin similarly to a dipole rotator in a vacuum, n is typically equal to 3. By integrating it and assuming that the pulsar's spin frequency at birth is far greater than what it is at present, we can determine the pulsar spin-down time, known as the characteristic age ($\sim -\nu/2\dot{\nu}$). Therefore, we can see that the spin frequency derivatives are crucial components in the evolution of pulsars.

Finally, we have demonstrated that the glitch activity trend in pulsars without records of glitches is consistent with the trend defined by pulsars with records of multiple glitches. Therefore, the estimated glitch activity aligns well with the observation.

8. Conclusions

Pulsar glitches are useful tools in astrophysics as they help us explore the interiors of neutron stars and gain insight into the behavior of matter beyond nuclear densities. Several studies have been conducted in that direction (e.g., Link et al. 1999; Chamel 2012, 2013; Wlazlowski et al. 2016; Eya et al. 2017a; Hujeirat & Samtaney 2019, 2020). To further our understanding of the events, it is necessary to study the interplay between the interior dynamics of neutron stars and that of the observable crust. One way to do this is by examining the relationship between activity parameters and spin parameters. This analysis is a step toward that. Glitch sizes, which are an important aspect of activity parameters, depend on the interior dynamics of the neutron star, including the number of superfluid vortices involved, their migration distance after unpinning and repinning, and their location. Conversely, spin parameters describe the dynamics of the crust. Therefore, estimating the activity parameter from the spin parameter can provide a connection between the crust and the interior. Previous studies have concentrated on the linear relationship between the activity parameter and a selected spin parameter (e.g., Link et al. 1999; Urama & Okeke 1999; Lyne et al. 2000; Wang et al. 2000; Andersson et al. 2012; Fuentes et al. 2017; Eya et al. 2019a, 2022). However, our analysis explores a different relationship between these parameters and finds that a quadratic fit provides a better fit to the data [see Figure 4 and Table 2, especially the magnitude R^2 and n_{res}]. This conclusion is in line with the fact that glitch activity peaks in middle-aged (10^4–10^5 yr) pulsars (Urama & Okeke 1999; Espinoza et al. 2011), a phenomenon that naturally fits a quadratic relationship (i.e., rising from pulsar birth, reaching maximum at middle age and declining after).

In conclusion, our study demonstrates that it is possible to estimate the glitch activities of pulsars using their spin parameters, with the spin frequency derivative being the most reliable tool for this purpose. This approach can be helpful for theorists who need the glitch activity parameters of pulsars as input parameters while studying the interiors of neutron stars.

Appendix

Table A1 shows the estimated activity parameters of pulsars obtained from the spin frequency derivative based on the quadratic nature relationship.

Table A1
Glitch Activity Parameters of Pulsars

Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g
J0002+6216	3.05E-08	2.64E-07	J0502+4654	7.79E-10	1.22E-09	J0821-4221	1.14E-09	2.87E-09	J1038-5831	3.79E-11	5.72E-11
J0006+1834	9.43E-11	1.36E-10	J0502-6617	7.41E-09	1.07E-08	J0821-4300	3.24E-13	2.87E-12	J1041-1942	1.59E-12	1.15E-12
J0007+7303	8.10E-07	2.56E-06	J0511-6508	8.60E-12	2.67E-11	J0826+2637	1.39E-10	2.62E-10	J1042-5521	2.01E-10	1.72E-10
J0012+5431	2.74E-16	9.06E-17	J0514-4408	7.65E-10	2.39E-09	J0828-3417	6.02E-13	3.26E-13	J1043-6116	1.34E-08	4.64E-08
J0014+4746	7.06E-13	5.69E-13	J0517+2212	4.24E-14	1.91E-13	J0831-4406	3.54E-10	1.14E-09	J1044-5737	2.83E-07	2.04E-06
J0021-0909	2.74E-13	1.18E-13	J0518+5125	1.64E-13	1.80E-13	J0834-4159	1.84E-08	1.52E-07	J1046+0304	2.72E-12	8.34E-12
J0024-7204ab	1.02E-14	2.75E-12	J0518+5416	4.60E-10	1.35E-09	J0835-3707	3.15E-09	5.81E-09	J1046-5813	1.81E-10	4.91E-10
J0024-7204F	1.58E-12	6.04E-10	J0519-6932	1.82E-10	6.90E-10	J0835-4510	7.41E-07	8.30E-06	J1047-3032	5.13E-13	1.55E-12
J0026+6320	4.52E-12	1.42E-11	J0520-2553	3.10E-13	1.28E-12	J0836-4233	2.99E-11	4.05E-11	J1047-6709	1.75E-09	8.80E-09
J0030+0451	4.05E-15	8.33E-13	J0522-6847	5.08E-09	7.53E-09	J0837+0610	1.60E-10	1.26E-10	J1048+5349	2.08E-13	7.63E-14
J0034-0721	9.19E-13	9.75E-13	J0525+1115	6.14E-13	1.73E-12	J0837-4135	2.09E-10	2.79E-10	J1048-5832	5.15E-07	4.16E-06
J0036-1033	2.28E-13	2.53E-13	J0528+2200	2.14E-10	5.72E-11	J0838-2621	2.30E-13	7.44E-13	J1048-5838	5.56E-10	4.52E-10
J0038-2501	1.30E-17	5.07E-17	J0529-0715	6.24E-12	9.06E-12	J0838-3947	5.03E-13	2.95E-13	J1049+5822	2.78E-10	3.83E-10
J0040+5716	4.07E-11	3.64E-11	J0529-6652	1.62E-09	1.66E-09	J0840-5332	5.07E-11	7.03E-11	J1049-5833	1.05E-11	4.77E-12
J0045-7042	1.74E-10	2.76E-10	J0532-6639	7.09E-10	1.10E-09	J0842-4851	1.99E-09	3.08E-09	J1052-5954	7.02E-08	3.89E-07
J0048+3412	2.00E-11	1.65E-11	J0533+0402	8.49E-14	8.81E-14	J0843-5022	2.32E-11	1.11E-10	J1052-6348	1.85E-11	4.82E-11
J0051+0423	1.63E-15	4.59E-15	J0533+6759	9.85E-15	2.25E-12	J0846-3533	1.16E-11	1.04E-11	J1054-5943	2.07E-09	5.96E-09
J0054+6946	5.33E-12	6.40E-12	J0533-4524	1.35E-10	8.61E-10	J0847-4316	4.78E-10	7.99E-11	J1054-5946	2.62E-11	1.15E-10
J0055+5117	6.54E-11	3.09E-11	J0534+2200	1.06E-06	3.18E-05	J0849+8028	1.44E-13	8.98E-14	J1054-6452	9.15E-12	4.97E-12
J0056+4756	6.75E-10	1.43E-09	J0534-6703	8.80E-08	4.84E-08	J0849-6322	8.94E-11	2.43E-10	J1055-6022	3.30E-08	3.48E-08
J0057-7201	7.24E-14	9.81E-14	J0535-6935	2.96E-08	1.48E-07	J0854+5449	1.69E-13	1.37E-13	J1055-6028	2.13E-07	2.14E-06
J0058+4950	3.65E-12	3.66E-12	J0536-7543	7.35E-13	5.90E-13	J0855-3331	1.40E-10	1.10E-10	J1055-6236	3.95E-11	8.81E-11
J0100+8023	1.07E-13	7.14E-14	J0537-6910	4.47E-07	2.77E-05	J0855-4644	8.09E-08	1.25E-06	J1055-6905	1.15E-10	3.93E-11
J0102+6537	5.09E-11	3.03E-11	J0538+2817	1.11E-08	7.78E-08	J0855-4658	4.74E-09	8.25E-09	J1056-5709	6.68E-12	9.88E-12
J0106+4855	1.32E-09	1.59E-08	J0540+3207	9.11E-12	1.74E-11	J0856-6137	2.11E-11	2.19E-11	J1056-6258	1.02E-09	2.42E-09
J0107+1322	1.29E-12	1.08E-12	J0540-6919	1.38E-06	2.73E-05	J0857+3349	2.87E-11	1.18E-10	J1057-4754	1.02E-12	1.62E-12
J0108+6608	5.63E-10	4.39E-10	J0540-7125	1.53E-12	1.19E-12	J0857-4424	2.89E-08	8.84E-08	J1057-5226	1.20E-08	6.06E-08
J0108+6905	2.22E-15	2.07E-15	J0543+2329	3.11E-08	1.27E-07	J0901-4624	1.17E-07	2.64E-07	J1057-5851	8.12E-08	1.31E-07
J0108-1431	2.69E-14	3.33E-14	J0543-6851	3.05E-10	4.30E-10	J0902-6325	1.47E-13	2.23E-13	J1057-7914	3.91E-12	2.90E-12
J0111+6624	4.04E-12	9.39E-13	J0546+2441	1.48E-11	5.21E-12	J0904-4246	2.65E-11	2.74E-11	J1058-5957	1.22E-11	1.98E-11
J0111-7131	9.87E-10	1.43E-09	J0554+3107	1.97E-07	4.25E-07	J0904-7459	8.30E-12	1.51E-11	J1059+6459	3.11E-12	8.57E-13
J0113-7220	3.19E-09	9.80E-09	J0555-7056	4.34E-10	5.25E-10	J0905-4536	6.41E-14	6.49E-14	J1059-5742	7.86E-11	6.63E-11
J0115+6325	1.28E-10	2.46E-10	J0557-2948	6.89E-17	1.58E-15	J0905-5127	3.31E-08	9.55E-08	J1101-6101	9.87E-08	1.57E-06
J0117+5914	3.60E-08	3.55E-07	J0600-5756	3.29E-12	1.46E-12	J0905-6019	4.92E-11	1.44E-10	J1103-5403	1.39E-15	4.09E-13

Table A1
(Continued)

Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g
J0122+1416	3.64E-11	2.62E-11	J0601-0527	1.90E-10	4.80E-10	J0907-5157	1.13E-09	4.46E-09	J1103-6025	1.12E-10	2.82E-10
J0131-7310	4.74E-10	1.36E-09	J0608+1635	1.38E-09	1.46E-09	J0908-1739	4.94E-11	1.23E-10	J1104-6103	9.94E-10	3.54E-09
J0133-6957	7.18E-13	1.55E-12	J0609+2130	5.77E-16	1.04E-14	J0908-4913	1.00E-07	9.40E-07	J1105+02	8.04E-15	1.26E-15
J0134-2937	1.71E-11	1.25E-10	J0611+1436	3.53E-09	1.31E-08	J0909-7212	1.27E-13	9.29E-14	J1105-4353	8.68E-10	2.47E-09
J0137+1654	3.62E-15	8.73E-15	J0612+3721	7.04E-13	2.36E-12	J0912-3851	2.34E-11	1.54E-11	J1105-6037	7.01E-08	3.60E-07
J0137+6349	1.66E-11	2.32E-11	J0612+37216	1.40E-12	3.16E-12	J0919-6040	1.26E-17	1.04E-17	J1105-6107	1.77E-07	2.79E-06
J0139+3336	1.38E-11	1.10E-11	J0613+3731	3.08E-10	4.98E-10	J0921+6254	2.17E-11	1.38E-11	J1106-6438	1.07E-12	3.94E-13
J0139+5621	6.35E-09	3.58E-09	J0614+2229	1.09E-07	3.26E-07	J0922+0638	9.07E-09	2.11E-08	J1107-5907	1.33E-14	5.26E-14
J0139+5814	1.56E-08	5.72E-08	J0621+0336	5.72E-15	2.12E-14	J0922-4949	3.56E-08	3.74E-08	J1107-5947	9.36E-14	6.17E-14
J0141+6009	3.05E-13	2.49E-13	J0622+3749	3.65E-08	1.09E-07	J0924-5302	1.24E-08	1.65E-08	J1107-6143	1.91E-08	1.06E-08
J0147+5922	6.17E-11	3.14E-10	J0623+0340	1.17E-13	1.91E-13	J0924-5814	4.14E-10	5.60E-10	J1110-5637	1.73E-10	3.10E-10
J0151-0635	2.03E-13	1.38E-13	J0624-0424	3.38E-12	3.25E-12	J0927+2345	1.02E-12	1.34E-12	J1112-6103	3.11E-07	4.78E-06
J0152+0948	4.73E-13	1.72E-13	J0627+0649	4.48E-10	1.29E-09	J0930-2301	1.14E-11	6.31E-12	J1112-6613	1.28E-10	3.84E-10
J0152-1637	1.95E-11	2.35E-11	J0627+0706	2.38E-08	5.01E-08	J0931-1902	3.86E-16	8.32E-14	J1112-6926	1.03E-10	1.26E-10
J0154+1833	3.12E-15	1.32E-12	J0628+0909	6.56E-13	5.28E-13	J0932-3217	1.44E-14	7.45E-15	J1114-6100	1.31E-08	1.49E-08
J0156+3949	4.91E-15	2.71E-15	J0629+2415	2.55E-10	5.34E-10	J0932-5327	3.75E-12	8.53E-13	J1115+5030	7.87E-12	4.75E-12
J0157+6212	1.42E-08	6.05E-09	J0630-0046	3.11E-10	4.57E-10	J0934-4154	2.19E-12	3.84E-12	J1115-0956	3.46E-16	2.64E-16
J0201+7005	8.73E-11	6.47E-11	J0630-2834	1.88E-10	1.51E-10	J0934-5249	4.91E-11	3.40E-11	J1115-6052	9.60E-09	3.69E-08
J0205+6449	1.02E-06	1.55E-05	J0631+0646	1.70E-08	1.53E-07	J0940-5428	2.62E-07	3.00E-06	J1116-2444	9.32E-12	1.07E-11
J0206-4028	4.02E-11	6.38E-11	J0631+1036	2.57E-07	8.93E-07	J0941-5244	3.16E-11	4.79E-11	J1116-4122	5.21E-10	5.53E-10
J0209+5759	1.07E-09	1.00E-09	J0633+0632	1.82E-07	6.11E-07	J0942-5552	7.86E-09	1.18E-08	J1117-6154	5.54E-09	1.10E-08
J0210+5845	1.56E-08	8.85E-09	J0633+1746	2.08E-08	8.78E-08	J0942-5657	1.25E-08	1.54E-08	J1117-6447	1.13E-13	9.81E-14
J0211-8159	2.40E-13	2.23E-13	J0633-2015	1.78E-12	5.48E-13	J0943+1631	1.18E-14	1.08E-14	J1119-6127	4.48E-06	1.10E-05
J0212+5222	3.80E-09	1.01E-08	J0636-4549	7.17E-12	3.61E-12	J0943+2253	2.12E-13	3.97E-13	J1119-7936	6.09E-12	2.67E-12
J0215+6218	1.81E-11	3.30E-11	J0645+5158	5.53E-17	6.25E-15	J0944+4106	1.01E-11	4.53E-12	J1121-5444	3.45E-10	6.44E-10
J0227+3356	2.85E-11	2.30E-11	J0646+0905	4.21E-12	4.66E-12	J0944-1354	2.90E-14	5.09E-14	J1123-4844	1.76E-12	7.18E-12
J0231+7026	1.96E-11	1.34E-11	J0647+0913	1.57E-10	1.27E-10	J0945-4833	3.04E-09	9.17E-09	J1123-6102	1.01E-09	1.58E-09
J0248+4230	1.12E-13	4.31E-11	J0652-0142	8.89E-14	9.62E-14	J0946+0951	6.48E-11	5.90E-11	J1123-6259	5.39E-09	1.99E-08
J0248+6021	1.78E-07	8.20E-07	J0653+8051	5.60E-11	4.61E-11	J0947+2740	1.52E-12	1.79E-12	J1123-6651	2.69E-09	1.16E-08
J0250+5854	7.51E-14	3.19E-15	J0656-2228	2.24E-16	1.83E-16	J0949-6902	1.00E-11	1.57E-11	J1124-3653	1.42E-14	5.88E-12
J0255-5304	3.06E-14	6.83E-14	J0656-5449	9.65E-13	5.27E-12	J0952-3839	5.08E-13	3.70E-13	J1124-5638	4.56E-14	2.46E-13
J0302+2252	5.70E-15	4.72E-15	J0658+0022	2.56E-09	4.54E-09	J0953+0755	2.32E-11	9.16E-11	J1124-5916	2.01E-06	1.48E-05
J0304+1932	3.31E-12	2.39E-12	J0658+2936	2.52E-11	3.06E-11	J0954-5430	4.19E-08	8.85E-08	J1124-6421	2.44E-11	5.09E-11
J0318+0253	1.16E-14	2.24E-12	J0659+1414	7.99E-08	2.08E-07	J0955-5304	1.39E-10	1.61E-10	J1126-6054	6.71E-11	3.31E-10
J0323+3944	2.46E-14	8.10E-15	J0709-5923	6.79E-13	1.40E-12	J0957-5432	2.08E-09	1.02E-08	J1126-6942	3.81E-10	6.58E-10
J0324+5239	2.70E-11	8.01E-11	J0711+0931	3.28E-13	2.70E-13	J0959-4809	7.41E-14	1.11E-13	J1128-6219	1.01E-15	1.95E-15
J0325+6744	5.34E-12	3.91E-12	J0711-6830	6.38E-15	1.16E-12	J1000-5149	3.54E-10	1.39E-09	J1130-5826	3.01E-13	1.85E-12
J0329+1654	2.40E-13	2.69E-13	J0719-2545	4.01E-10	4.12E-10	J1001-5507	5.11E-09	3.55E-09	J1130-5925	1.94E-11	2.85E-11
J0332+5434	8.21E-11	1.15E-10	J0725-1635	5.42E-13	1.28E-12	J1001-5559	6.38E-13	3.84E-13	J1130-6807	8.85E-11	3.45E-10
J0335+4555	6.03E-15	2.24E-14	J0726-2612	1.20E-08	3.49E-09	J1001-5939	4.57E-11	5.92E-12	J1132-4700	1.23E-10	3.78E-10
J0335+6623	2.74E-11	1.56E-11	J0729-1448	3.25E-07	1.29E-06	J1002-5559	3.66E-11	4.70E-11	J1132-5627	5.91E-12	3.37E-11
J0340+4130	7.21E-15	2.18E-12	J0729-1836	1.05E-08	2.05E-08	J1002-5919	9.63E-14	1.35E-13	J1133-6250	8.63E-13	8.43E-13
J0343+5312	1.77E-10	9.15E-11	J0733-2345	3.72E-11	2.07E-11	J1003-4747	8.72E-10	2.84E-09	J1135-6055	4.60E-07	4.00E-06
J0343-3000	5.31E-17	2.04E-17	J0734-1559	4.73E-08	3.03E-07	J1006-6311	3.15E-12	3.76E-12	J1136+1551	5.80E-11	4.88E-11
J0344-0901	4.49E-11	3.66E-11	J0736-6304	1.42E-09	2.93E-10	J1012-2337	1.28E-13	5.07E-14	J1136-5525	5.80E-09	1.59E-08
J0349+2340	2.64E-13	1.09E-13	J0737-2202	4.02E-09	1.25E-08	J1012-5830	1.02E-09	4.77E-10	J1136-6527	1.13E-11	9.49E-12
J0357+3205	7.84E-09	1.77E-08	J0738+6904	1.15E-11	1.68E-12	J1012-5857	3.22E-09	3.92E-09	J1137-6700	1.03E-13	1.85E-13
J0357+5236	1.97E-10	9.99E-10	J0738-4042	2.45E-10	6.55E-10	J1013-5934	2.50E-11	5.64E-11	J1138-6207	7.21E-08	6.13E-07
J0358+4155	1.28E-11	5.67E-11	J0742+4334	3.66E-12	6.04E-12	J1015-5719	2.95E-07	2.11E-06	J1141-3107	1.74E-10	3.23E-10
J0358+5413	1.22E-08	7.82E-08	J0742-2822	6.38E-08	3.83E-07	J1016-5345	5.77E-11	7.49E-11	J1141-3322	6.24E-11	2.14E-10
J0358+6627	9.69E-13	1.06E-11	J0745-5353	2.23E-09	1.04E-08	J1016-5819	2.52E-09	2.87E-08	J1142-6230	1.25E-13	2.23E-13
J0359+5414	1.52E-07	1.92E-06	J0746-4529	8.69E-11	3.11E-11	J1016-5857	4.89E-07	4.55E-06	J1143-5158	1.01E-11	1.50E-11
J0401-7608	1.05E-10	1.93E-10	J0747+6646	4.85E-11	1.19E-10	J1017+3011	2.45E-11	5.41E-11	J1143-5536	4.35E-12	6.35E-12
J0402+4825	3.37E-12	6.59E-12	J0749-4247	4.06E-12	3.70E-12	J1017-5621	5.11E-10	1.02E-09	J1144-6217	7.42E-09	8.73E-09
J0406+6138	9.37E-10	1.58E-09	J0750-6846	3.98E-14	4.35E-14	J1018-1642	2.52E-12	1.40E-12	J1146-6030	9.01E-10	3.30E-09
J0415+6954	4.70E-13	1.20E-12	J0754+3231	1.88E-12	1.30E-12	J1019-5749	8.17E-08	5.02E-07	J1148-5725	1.56E-11	4.38E-12
J0418-4154	2.76E-11	3.64E-11	J0758-1528	5.86E-11	8.59E-11	J1020-5921	4.83E-09	3.90E-09	J1148-6415	7.97E-13	2.46E-13
J0421+3255	8.75E-15	9.72E-15	J0803-0942	5.14E-11	9.00E-11	J1020-6026	2.62E-08	1.87E-07	J1151-6108	6.96E-08	6.85E-07
J0421-0345	4.78E-13	2.21E-13	J0804-3647	9.59E-12	4.38E-12	J1021-5601	2.28E-14	3.40E-14	J1152-5800	1.26E-12	7.01E-13
J0426+4933	9.20E-09	9.97E-09	J0807-5421	6.19E-12	1.18E-11	J1022-5813	2.09E-08	1.27E-08	J1152-6012	3.88E-09	1.03E-08
J0435+2749	3.49E-15	1.07E-14	J0808-3937	1.21E-12	1.39E-12	J1023-5746	1.41E-06	1.27E-05	J1154-6250	9.84E-11	3.49E-10
J0448-2749	1.30E-12	2.89E-12	J0809-4753	3.93E-10	7.18E-10	J1024-0719	1.33E-14	2.58E-12	J1156-5707	4.93E-08	1.71E-07

Table A1
(Continued)

Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g
J0449-7031	6.64E-10	1.39E-09	J0812-3905	5.64E-14	1.17E-13	J1028-5819	1.28E-07	1.40E-06	J1156-5909	5.42E-12	5.22E-12
J0450-1248	6.13E-13	1.40E-12	J0814+7429	2.84E-14	2.20E-14	J1031-6117	6.74E-10	2.20E-09	J1157-6224	1.38E-09	3.44E-09
J0452-1759	1.22E-09	2.22E-09	J0815+0939	2.93E-13	4.54E-13	J1032-5206	1.62E-10	6.72E-11	J1159-6409	2.77E-15	4.15E-15
J0454+4529	6.19E-11	4.45E-11	J0815+4611	1.23E-16	2.83E-16	J1032-5911	2.25E-10	4.84E-10	J1159-7910	3.73E-10	7.11E-10
J0454+5543	8.52E-10	2.50E-09	J0818-3049	4.41E-12	5.77E-12	J1034-3224	1.04E-13	9.01E-14	J1201-6306	4.15E-10	7.00E-10
J0455-6951	1.06E-08	3.31E-08	J0818-3232	1.60E-13	7.43E-14	J1035-6345	3.76E-12	6.49E-12	J1202-5820	3.32E-10	7.33E-10
J0456-7031	1.13E-08	1.41E-08	J0820-1350	1.48E-11	1.20E-11	J1035-6720	6.50E-13	2.26E-10	J1204-6843	1.10E-11	3.55E-11
J0457-6337	2.89E-15	1.16E-15	J0820-3826	8.04E-09	6.44E-08	J1036-4926	1.46E-10	2.85E-10	J1207-4508	2.09E-12	1.18E-12
J0458-0505	1.16E-13	6.17E-14	J0820-3921	8.11E-10	7.55E-10	J1036-6559	8.74E-11	1.64E-10	J1207-5050	1.17E-15	2.43E-13
J0459-0210	8.10E-12	7.15E-12	J0820-4114	3.96E-15	7.27E-15	J1038+0032	3.45E-16	1.20E-14	J1208-6238	3.84E-06	8.71E-06
J1210-5226	1.59E-14	3.75E-14	J1341-6023	6.98E-09	1.11E-08	J1510-4422	2.31E-12	2.45E-12	J1555-3134	9.59E-14	1.85E-13
J1210-5559	1.65E-10	5.91E-10	J1341-6220	8.56E-07	4.43E-06	J1511-5414	1.94E-10	9.69E-10	J1556-5358	7.48E-10	7.52E-10
J1210-6322	3.84E-10	3.30E-10	J1343+6634	2.17E-12	1.56E-12	J1511-5835	3.10E-11	1.03E-10	J1557-4258	2.15E-11	6.54E-11
J1210-6550	1.83E-15	4.32E-16	J1344-5855	2.47E-09	9.80E-09	J1512-5431	2.01E-12	9.84E-13	J1557-5151	3.85E-13	9.44E-13
J1211-6324	5.15E-12	1.19E-11	J1344-6059	3.16E-14	5.86E-14	J1512-5759	3.07E-08	2.39E-07	J1558-5419	1.08E-09	1.82E-09
J1214-5830	6.12E-15	6.72E-15	J1345-6115	3.64E-11	2.91E-11	J1513-5739	4.48E-09	4.61E-09	J1558-5756	6.66E-08	5.93E-08
J1215-5328	1.94E-13	3.06E-13	J1346-4918	1.98E-13	6.60E-13	J1513-5908	2.84E-06	1.87E-05	J1559-4438	3.89E-10	1.52E-09
J1216-6223	1.64E-08	4.39E-08	J1347-5947	4.42E-09	7.24E-09	J1513-5946	4.45E-10	4.25E-10	J1559-5545	2.67E-09	2.79E-09
J1220-6318	3.30E-14	4.19E-14	J1348-6307	1.28E-10	1.38E-10	J1513-6013	1.05E-12	5.35E-13	J1600-5044	1.02E-08	5.28E-08
J1221-0633	1.15E-13	5.96E-11	J1349-6130	5.70E-09	2.20E-08	J1514-4834	6.52E-11	1.43E-10	J1600-5751	2.66E-09	1.37E-08
J1222-5738	4.62E-14	4.27E-14	J1350-5115	1.54E-10	5.20E-10	J1514-5316	5.60E-17	1.89E-16	J1600-5916	2.03E-12	1.62E-12
J1223-5856	2.24E-15	7.75E-15	J1350-6225	3.83E-08	2.77E-07	J1514-5925	7.32E-09	4.92E-08	J1601-5244	7.09E-14	2.77E-14
J1224-6208	8.61E-09	1.47E-08	J1352-6803	4.32E-11	6.87E-11	J1515-5720	6.06E-09	2.11E-08	J1601-5335	1.42E-07	4.94E-07
J1224-6407	7.84E-09	3.62E-08	J1354-6249	5.62E-11	1.90E-11	J1517-4356	8.09E-13	1.24E-12	J1602-4957	2.66E-09	3.24E-09
J1225-5556	2.72E-11	2.67E-11	J1355-5153	2.09E-10	3.25E-10	J1517-4636	4.41E-11	4.97E-11	J1602-5100	2.58E-08	2.99E-08
J1225-6035	1.81E-12	2.88E-12	J1355-5747	1.78E-13	8.74E-14	J1518+0204A	6.25E-14	1.13E-11	J1603-2531	6.75E-10	2.39E-09
J1225-6408	8.64E-11	2.06E-10	J1355-5925	1.43E-10	1.18E-10	J1518-0627	1.82E-12	2.29E-12	J1603-2712	1.37E-10	1.77E-10
J1226+0005	2.40E-12	1.05E-12	J1355-6206	5.39E-16	1.95E-15	J1518-3952	2.62E-12	5.26E-12	J1603-3539	3.84E-11	2.71E-10
J1226-3223	6.40E-13	1.03E-13	J1356-5521	2.81E-11	5.53E-11	J1518-5415	9.50E-13	4.42E-12	J1603-5312	1.64E-08	1.95E-08
J1231-4609	2.79E-15	3.19E-15	J1357-6429	1.21E-06	7.31E-06	J1519-5734	8.28E-10	1.60E-09	J1603-5657	4.29E-10	8.65E-10
J1231-6303	1.23E-14	9.13E-15	J1359-6038	2.82E-08	2.21E-07	J1519-6106	4.66E-11	2.16E-11	J1604-3142	1.01E-15	1.15E-15
J1232-4742	3.74E-18	2.00E-18	J1400-6325	4.56E-07	1.46E-05	J1519-6308	1.28E-10	1.02E-10	J1604-4718	1.04E-09	1.97E-09
J1233-6312	1.57E-09	2.78E-09	J1401-6357	2.73E-09	3.24E-09	J1522-5525	2.68E-11	1.93E-11	J1604-4909	2.03E-10	6.20E-10
J1233-6344	2.45E-10	3.24E-10	J1402-5021	7.82E-11	5.66E-11	J1522-5735	2.20E-07	2.15E-06	J1604-7203	9.56E-13	2.80E-12
J1234-3630	2.84E-11	4.98E-11	J1403-6310	6.22E-13	1.56E-12	J1522-5829	4.49E-10	1.13E-09	J1605-5215	1.55E-10	1.53E-10
J1235-6354	1.62E-11	6.29E-11	J1403-7646	3.49E-12	2.67E-12	J1523-3235	1.19E-12	7.93E-13	J1605-5257	1.16E-12	1.77E-12
J1236-0159	2.44E-12	6.78E-13	J1404+1159	3.22E-13	1.22E-13	J1524-5625	3.29E-07	4.21E-06	J1607-0032	8.24E-12	1.95E-11
J1236-5033	6.28E-12	2.13E-11	J1405-5641	4.30E-11	6.96E-11	J1524-5706	1.65E-07	1.48E-07	J1607-5140	9.45E-10	2.76E-09
J1237-6725	2.41E-12	1.14E-12	J1406-4233	7.52E-14	3.09E-14	J1524-5819	5.07E-08	5.28E-08	J1607-6449	8.80E-14	2.95E-13
J1238+2152	9.12E-12	8.15E-12	J1406-5806	1.10E-10	3.80E-10	J1525-5417	1.60E-09	1.58E-09	J1609-1930	2.24E-13	1.44E-13
J1239+2453	1.67E-12	1.21E-12	J1406-6121	1.81E-07	8.47E-07	J1525-5523	3.09E-15	8.70E-15	J1609-4616	1.13E-10	4.51E-10
J1239-6832	4.52E-10	3.47E-10	J1407-6048	5.48E-10	1.11E-09	J1525-5605	3.95E-12	1.41E-11	J1609-5158	5.61E-10	4.39E-10
J1240-4124	1.59E-10	3.11E-10	J1407-6153	1.40E-09	1.99E-09	J1526-5633	3.47E-12	1.15E-11	J1610-1322	1.68E-13	1.65E-13
J1243-5735	2.57E-13	5.44E-13	J1409-6953	3.37E-11	6.38E-11	J1527-3931	1.82E-10	7.53E-11	J1610-5006	7.07E-09	1.47E-08
J1243-6423	1.86E-09	4.80E-09	J1410-6132	3.60E-07	7.19E-06	J1527-5552	7.49E-10	7.14E-10	J1610-5303	1.01E-10	1.28E-10
J1244-1812	1.36E-13	3.97E-14	J1410-7404	4.14E-15	1.49E-14	J1528-4109	6.84E-12	1.30E-11	J1611-4811	1.07E-11	8.23E-12
J1244-5053	3.14E-10	1.14E-09	J1412+7922	3.88E-08	6.67E-07	J1528-5547	7.50E-12	2.16E-12	J1611-4949	6.13E-12	9.20E-12
J1244-6531	9.80E-11	6.34E-11	J1412-6111	1.75E-10	3.30E-10	J1528-5838	3.13E-08	8.81E-08	J1611-5209	1.16E-08	6.35E-08
J1245-6238	6.81E-11	2.98E-11	J1412-6145	2.16E-07	6.86E-07	J1529-5355	5.50E-12	6.17E-12	J1611-5847	4.75E-17	1.34E-16
J1246+2253	3.24E-13	6.84E-13	J1413-6141	8.20E-07	2.87E-06	J1529-5611	2.18E-10	2.65E-10	J1612+2008	5.79E-14	1.36E-13
J1248-6344	4.98E-08	2.51E-07	J1413-6205	1.83E-07	1.66E-06	J1530-5327	4.24E-09	1.52E-08	J1612-2408	2.10E-11	2.27E-11
J1248-6444	1.24E-11	1.00E-11	J1413-6222	1.12E-09	3.82E-09	J1530-6343	5.32E-12	5.85E-12	J1612-5022	2.67E-16	1.95E-16
J1249-6507	2.86E-15	6.58E-15	J1413-6307	4.14E-09	1.05E-08	J1531-4012	1.12E-12	3.13E-12	J1612-5136	8.00E-10	1.66E-09
J1251-7407	2.70E-11	8.27E-11	J1414-6802	1.59E-12	3.44E-13	J1531-5610	1.18E-07	1.41E-06	J1612-5805	2.59E-11	4.21E-11
J1252-6314	5.99E-14	7.27E-14	J1415-6621	3.97E-11	1.01E-10	J1532+2745	2.19E-12	1.95E-12	J1613-4714	5.14E-11	1.34E-10
J1253-5820	1.40E-09	5.47E-09	J1416-5033	8.94E-14	1.12E-13	J1532-5308	1.96E-13	4.41E-13	J1613-5211	1.34E-08	2.93E-08
J1254-6150	3.81E-10	2.06E-09	J1416-6037	3.24E-09	1.10E-08	J1534-4428	4.33E-14	3.55E-14	J1613-5234	9.95E-10	1.52E-09
J1255-6131	3.87E-10	5.88E-10	J1418-3921	3.26E-12	2.97E-12	J1534-5334	4.36E-12	3.19E-12	J1614+0737	2.07E-11	1.72E-11
J1257-1027	3.26E-12	5.28E-12	J1418-5945	3.33E-14	1.99E-14	J1534-5405	6.01E-10	2.08E-09	J1614-3846	6.05E-11	1.30E-10
J1259-6741	1.68E-11	2.54E-11	J1418-6058	8.43E-07	7.62E-06	J1535-4114	1.21E-09	2.79E-09	J1614-3937	2.17E-12	5.33E-12
J1300-6602	2.71E-13	2.37E-13	J1420-5416	2.41E-13	2.58E-13	J1535-4415	4.92E-14	1.05E-13	J1614-5048	1.31E-06	5.65E-06
J1301-6305	9.18E-07	4.98E-06	J1420-6048	6.18E-07	9.07E-06	J1535-5450	5.34E-09	9.42E-09	J1614-5144	1.08E-10	7.06E-11

Table A1
(Continued)

Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g
J1301-6310	3.19E-08	4.81E-08	J1422-6138	1.91E-07	5.59E-07	J1535-5848	1.39E-09	4.53E-09	J1614-5402	8.82E-15	1.54E-14
J1302-3258	3.71E-15	9.85E-13	J1423-6953	3.73E-10	1.12E-09	J1536-3602	1.25E-12	9.47E-13	J1615-2940	5.98E-13	2.41E-13
J1302-6313	3.13E-10	3.23E-10	J1424-5556	8.37E-12	1.09E-11	J1536-5433	3.69E-11	4.19E-11	J1615-4958	8.78E-11	1.57E-10
J1303-6305	1.72E-12	7.44E-13	J1424-5822	1.71E-09	4.66E-09	J1536-5907	7.69E-11	1.38E-10	J1615-5444	1.69E-11	4.67E-11
J1305-6203	3.24E-08	7.58E-08	J1424-6438	1.86E-13	1.81E-13	J1537-4912	8.09E-10	2.69E-09	J1615-5537	5.70E-11	7.20E-11
J1305-6256	2.81E-10	5.88E-10	J1425-5723	3.27E-14	9.27E-14	J1537-5153	3.24E-11	2.12E-11	J1616-5017	4.25E-08	8.64E-08
J1305-6455	5.76E-10	1.01E-09	J1425-5759	9.97E-12	1.41E-11	J1537-5645	6.20E-10	1.44E-09	J1616-5109	1.32E-09	1.08E-09
J1306-6242	2.58E-10	2.63E-10	J1425-6210	1.21E-11	2.42E-11	J1538+2345	5.81E-12	1.68E-12	J1616-5208	4.29E-09	4.18E-09
J1306-6617	1.89E-09	3.99E-09	J1427-4158	1.27E-11	2.17E-11	J1538-5438	5.86E-10	2.12E-09	J1617-4216	5.28E-11	1.54E-11
J1307-6318	2.07E-11	4.17E-12	J1428-5530	1.67E-10	2.92E-10	J1538-5519	9.73E-14	2.46E-13	J1617-4608	6.67E-09	1.18E-08
J1308-4650	1.09E-12	1.03E-12	J1429-5911	1.91E-07	1.65E-06	J1538-5551	1.59E-08	1.52E-07	J1617-5055	8.33E-07	1.20E-05
J1308-5844	3.66E-09	7.87E-09	J1429-5935	1.58E-08	2.07E-08	J1538-5621	5.19E-11	2.72E-11	J1618-4723	2.16E-09	1.06E-08
J1309-6415	1.89E-09	3.05E-09	J1430-5712	4.29E-08	8.72E-08	J1538-5638	5.76E-10	6.82E-10	J1620-4927	3.37E-08	1.96E-07
J1309-6526	1.27E-14	3.18E-14	J1430-6623	1.14E-10	1.45E-10	J1538-5732	2.58E-09	7.57E-09	J1620-5414	3.98E-15	3.44E-15
J1311-1228	1.39E-12	3.10E-12	J1432-5032	2.66E-11	1.31E-11	J1538-5750	3.92E-14	7.75E-14	J1621-5039	8.97E-10	8.28E-10
J1312-5402	2.08E-13	2.86E-13	J1433-6038	2.73E-11	1.40E-11	J1539-4828	4.30E-12	3.38E-12	J1621-5243	8.18E-11	2.20E-10
J1312-5516	3.72E-10	4.38E-10	J1434+7257	1.65E-14	3.96E-13	J1539-5521	2.82E-12	2.80E-12	J1622-3751	1.21E-10	1.65E-10
J1312-6400	7.58E-14	3.11E-14	J1434-5943	5.70E-16	5.31E-16	J1539-5626	5.99E-09	2.46E-08	J1622-4332	2.12E-11	2.31E-11
J1313+0931	6.33E-12	7.46E-12	J1434-6006	1.68E-09	5.47E-09	J1539-6322	1.69E-14	1.04E-14	J1622-4347	1.53E-09	3.34E-09
J1314-6101	3.39E-11	1.15E-11	J1434-6029	7.18E-12	7.46E-12	J1540-5736	4.66E-12	7.61E-12	J1622-4802	3.62E-11	1.37E-10
J1316-6232	3.28E-09	9.57E-09	J1435-5954	1.60E-10	3.38E-10	J1541+47	1.44E-11	5.17E-11	J1622-4845	9.83E-14	1.34E-13
J1317-5759	5.68E-11	2.15E-11	J1437-5959	1.01E-07	1.63E-06	J1541-5535	1.71E-07	5.78E-07	J1622-4944	1.52E-09	1.41E-09
J1317-6302	3.79E-12	1.45E-11	J1437-6146	2.14E-09	4.57E-09	J1542-5034	5.06E-10	8.44E-10	J1623-0841	2.11E-10	4.19E-10
J1319-6056	6.19E-10	2.18E-09	J1440-6344	9.24E-11	2.01E-10	J1542-5133	1.88E-13	1.05E-13	J1623-0908	2.08E-11	1.63E-11
J1319-6105	2.10E-10	4.98E-10	J1441-6137	2.89E-13	2.46E-13	J1542-5303	1.52E-08	1.26E-08	J1623-4256	1.46E-10	4.01E-10
J1320-3512	1.11E-17	2.43E-17	J1443-5122	1.51E-12	2.06E-12	J1543+0929	2.45E-12	3.28E-12	J1623-4949	1.72E-08	2.37E-08
J1320-5359	1.20E-08	4.27E-08	J1444-5941	1.94E-11	7.01E-12	J1543-0620	1.44E-11	2.03E-11	J1624+5850	2.18E-12	3.35E-12
J1321+8323	6.64E-12	9.91E-12	J1444-6026	1.79E-11	3.75E-12	J1543-5013	2.20E-09	3.41E-09	J1624+8643	6.83E-12	1.73E-11
J1321-5922	1.72E-11	1.34E-11	J1449-5846	3.25E-13	7.01E-13	J1543-5459	7.71E-08	2.04E-07	J1624-4041	1.19E-08	7.09E-08
J1322-6241	3.52E-10	6.95E-10	J1452-5851	7.15E-08	1.85E-07	J1544-0713	8.14E-11	1.68E-10	J1624-4411	3.24E-10	1.39E-09
J1322-6329	3.72E-11	1.35E-11	J1452-6036	2.37E-09	1.53E-08	J1544-5308	4.27E-12	2.39E-11	J1624-4613	1.04E-14	1.20E-14
J1324-6146	3.62E-10	4.29E-10	J1453+1902	2.89E-15	4.99E-13	J1546-5302	3.66E-09	6.29E-09	J1624-4721	1.14E-09	2.54E-09
J1324-6302	1.77E-13	7.13E-14	J1453-6413	4.69E-09	2.61E-08	J1546-5925	2.01E-15	2.58E-13	J1625-4048	2.81E-14	1.19E-14
J1326-4728A	6.86E-14	1.67E-11	J1456-6843	3.42E-12	1.30E-11	J1547-0944	1.35E-11	8.56E-12	J1625-4904	1.07E-08	2.33E-08
J1326-5859	6.23E-10	1.30E-09	J1457-5122	3.47E-11	1.98E-11	J1547-5750	3.74E-15	5.78E-15	J1625-4913	4.36E-09	1.22E-08
J1326-6408	1.37E-10	1.73E-10	J1457-5900	2.60E-11	1.74E-11	J1547-5839	1.69E-10	6.99E-10	J1626-4537	5.67E-09	1.53E-08
J1326-6700	1.09E-09	2.01E-09	J1457-5902	9.39E-09	2.40E-08	J1548-4821	2.30E-16	1.58E-15	J1626-4807	2.71E-08	9.23E-08
J1327-6222	9.54E-09	1.80E-08	J1459-6053	1.77E-07	1.72E-06	J1548-4927	5.03E-10	8.35E-10	J1626-6621	4.57E-11	1.01E-10
J1327-6301	1.52E-09	7.75E-09	J1501-0046	3.46E-12	7.46E-12	J1548-5607	3.51E-08	2.05E-07	J1627+1419	8.54E-12	1.74E-11
J1327-6400	6.34E-08	2.26E-07	J1501-5637	2.31E-13	2.95E-13	J1549+2113	1.77E-12	1.41E-12	J1627-4706	3.83E-09	2.72E-08
J1328-4357	4.07E-10	7.64E-10	J1502+4653	8.04E-15	4.59E-15	J1549-4848	2.08E-08	7.21E-08	J1627-4845	3.95E-10	6.46E-10
J1328-4921	4.33E-13	2.93E-13	J1502-5653	1.55E-10	2.89E-10	J1549-5722	5.60E-14	1.12E-13	J1627-5547	8.86E-11	2.51E-10
J1329-6158	1.95E-09	1.24E-09	J1502-5828	1.63E-08	2.45E-08	J1550-5242	3.98E-09	5.31E-09	J1627-5936	2.33E-15	6.58E-15
J1331-5245	5.86E-12	9.04E-12	J1502-6128	2.04E-11	2.42E-11	J1550-5317	1.41E-12	9.95E-13	J1628+4406	3.19E-13	1.76E-12
J1332-3032	7.18E-12	1.10E-11	J1503+2111	2.25E-16	6.79E-17	J1551-4424	5.13E-13	7.62E-13	J1628-4804	1.57E-11	1.81E-11
J1333-4449	9.99E-19	2.89E-18	J1504-5621	2.29E-09	5.54E-09	J1551-5310	2.94E-07	6.48E-07	J1628-4828	2.58E-11	6.23E-12
J1334-5839	2.49E-12	2.31E-11	J1504-5659	2.10E-12	1.25E-12	J1551-6214	3.32E-13	1.67E-12	J1629-3636	1.02E-11	3.40E-12
J1336-2522	6.40E-12	1.34E-11	J1506-5158	4.71E-10	5.61E-10	J1552+5437	2.56E-15	1.05E-12	J1629-3825	8.81E-12	1.67E-11
J1337-4441	1.45E-13	1.15E-13	J1507-4352	6.47E-10	2.26E-09	J1552-4937	6.85E-15	1.09E-12	J1629-6902	1.74E-15	2.90E-13
J1337-6306	9.81E-11	4.72E-10	J1507-5800	3.76E-13	4.19E-13	J1553-5456	1.28E-09	1.18E-09	J1630-2609	1.59E-12	8.31E-13
J1338-6204	6.91E-10	5.58E-10	J1507-6640	2.03E-10	5.72E-10	J1554-5209	7.31E-09	5.84E-08	J1630-4719	5.40E-09	9.67E-09
J1339-4712	9.37E-17	6.84E-16	J1509+5531	4.26E-10	5.75E-10	J1554-5512	1.70E-10	4.97E-11	J1630-4733	1.04E-08	1.81E-08
J1339-6618	4.25E-12	7.61E-12	J1509-5850	7.22E-08	8.12E-07	J1555-0515	3.10E-11	3.18E-11	J1631-1612	2.66E-11	3.93E-11
J1340-6456	2.41E-09	6.37E-09	J1509-6015	7.08E-10	2.09E-09	J1555-2341	2.20E-11	4.14E-11	J1631-4155	4.08E-16	7.40E-16
J1632-1013	2.96E-14	4.12E-14	J1658-5324	5.73E-14	2.35E-11	J1724-3505	1.58E-09	1.29E-09	J1746-2849	3.54E-10	2.40E-10
J1632-4509	1.26E-09	1.20E-09	J1659-1305	9.34E-12	1.46E-11	J1724-4500	3.73E-11	2.85E-11	J1746-2850	8.73E-07	8.11E-07
J1632-4621	6.51E-09	3.81E-09	J1659-4316	1.50E-12	3.16E-12	J1725-0732	9.39E-11	3.91E-10	J1746-2856	1.20E-09	1.27E-09
J1632-4757	3.42E-08	1.49E-07	J1659-4439	4.52E-14	1.28E-13	J1725-2852	1.24E-11	9.88E-12	J1746-3239	1.38E-08	6.92E-08
J1632-4818	5.48E-07	6.74E-07	J1700-0954	6.29E-12	7.70E-12	J1725-3546	1.32E-09	1.28E-09	J1747-1030	1.40E-13	8.87E-14
J1633-2009	8.64E-12	9.24E-12	J1700-3312	6.16E-11	4.53E-11	J1725-3848	4.31E-10	2.09E-10	J1747-2647	6.20E-09	1.24E-08
J1633-4453	2.43E-09	5.58E-09	J1700-3611	3.77E-11	2.52E-11	J1725-3853	1.58E-13	3.31E-11	J1747-2802	1.02E-12	3.67E-13
J1633-4805	4.39E-08	6.18E-08	J1700-3919	7.51E-17	1.34E-16	J1725-4043	1.55E-11	1.06E-11	J1747-2809	9.12E-07	1.75E-05

Table A1
(Continued)

Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g
J1633-5015	1.76E-09	5.01E-09	J1700-4012	2.66E-12	9.37E-12	J1726-3530	7.54E-07	6.79E-07	J1747-2958	4.11E-07	4.16E-06
J1634-4229	5.28E-11	2.62E-11	J1700-4422	6.33E-15	8.38E-15	J1726-3635	5.42E-10	1.89E-09	J1747-4036	2.77E-13	1.68E-10
J1634-5107	1.35E-10	2.66E-10	J1700-4939	4.24E-11	7.34E-11	J1726-4006	1.15E-10	1.30E-10	J1748-1300	1.68E-10	4.27E-10
J1634-5640	8.44E-13	3.76E-12	J1701-3130	6.64E-13	2.28E-12	J1727-2739	2.75E-12	2.13E-12	J1748-2021A	4.75E-11	1.64E-10
J1635+2332	2.14E-12	1.77E-12	J1701-3726	5.58E-11	2.27E-11	J1728-0007	1.54E-10	3.99E-10	J1748-2021E	1.39E-13	8.57E-12
J1635+2418	5.74E-13	1.17E-12	J1701-4533	5.73E-11	1.77E-10	J1728-3733	6.92E-14	1.12E-13	J1748-2444	7.12E-13	1.61E-12
J1635-1511	9.57E-14	8.11E-14	J1701-4958	6.83E-14	8.49E-14	J1728-4028	3.28E-13	3.79E-13	J1748-2446aj	4.86E-12	1.64E-09
J1635-4513	2.05E-11	1.29E-11	J1702-3932	1.66E-11	4.26E-11	J1729-2117	1.13E-16	1.71E-15	J1748-2446ak	6.61E-12	3.50E-09
J1635-4944	1.54E-09	2.30E-09	J1702-4128	2.06E-07	1.13E-06	J1730-2304	2.98E-15	3.67E-13	J1749+5952	1.55E-12	3.55E-12
J1635-5954	9.04E-11	1.71E-10	J1702-4217	3.70E-14	1.62E-13	J1730-2900	1.53E-10	9.97E-11	J1749-2146	1.46E-11	5.39E-12
J1636-2614	7.87E-10	1.54E-09	J1702-4306	2.10E-08	9.75E-08	J1730-3350	4.24E-07	3.04E-06	J1749-2347	6.21E-11	7.10E-11
J1636-4440	1.57E-07	7.62E-07	J1702-4310	6.57E-07	2.73E-06	J1730-3353	9.34E-11	2.86E-11	J1749-2629	7.22E-12	5.41E-12
J1636-4803	1.59E-09	1.32E-09	J1702-4428	6.12E-12	2.88E-12	J1731-3123	4.64E-11	6.16E-11	J1749-3002	1.62E-09	2.66E-09
J1636-4933	1.98E-10	4.61E-10	J1703-1846	4.02E-11	4.99E-11	J1731-3322	1.67E-08	3.07E-08	J1749-4931	2.77E-11	6.21E-11
J1637-4335	2.03E-10	2.63E-10	J1703-3241	1.12E-12	9.26E-13	J1731-4744	9.55E-08	1.15E-07	J1749-5417	5.00E-12	1.63E-11
J1637-4450	1.41E-10	5.59E-10	J1703-4442	2.74E-10	1.57E-10	J1732-1930	1.61E-12	3.33E-12	J1749-5605	1.17E-11	8.77E-12
J1637-4553	1.28E-08	1.08E-07	J1703-4851	6.58E-11	4.71E-11	J1732-3131	9.35E-08	4.76E-07	J1750-2043	1.26E-12	2.23E-13
J1637-4642	2.78E-07	1.81E-06	J1704-3756	1.35E-08	4.43E-08	J1732-3426	3.12E-11	9.38E-11	J1750-2438	1.91E-09	2.68E-09
J1637-4721	8.83E-11	7.57E-11	J1704-5236	1.30E-12	5.64E-12	J1732-3729	6.06E-13	2.77E-13	J1750-2444	3.85E-13	4.28E-13
J1637-4816	4.04E-10	4.82E-10	J1704-6016	1.97E-10	6.44E-10	J1732-4128	3.50E-09	5.58E-09	J1750-28	1.08E-10	8.29E-11
J1638+4005	2.91E-13	3.79E-13	J1705-1906	2.99E-09	9.99E-09	J1732-4156	9.17E-11	2.84E-10	J1750-3157	1.78E-13	1.96E-13
J1638-3815	4.92E-14	7.05E-14	J1705-3423	4.36E-10	1.71E-09	J1733-2228	4.04E-15	4.63E-15	J1750-3503	8.57E-15	1.25E-14
J1638-3951	4.45E-12	5.77E-12	J1705-3936	3.34E-09	3.90E-09	J1733-2533	1.10E-10	1.66E-10	J1750-3703D	1.09E-11	2.13E-09
J1638-4233	3.80E-09	7.43E-09	J1705-3950	1.20E-07	3.76E-07	J1733-2837	1.81E-11	2.36E-11	J1751-2516	7.10E-10	1.80E-09
J1638-4344	2.87E-16	2.56E-16	J1705-4108	8.76E-09	1.02E-08	J1733-3030	3.78E-10	1.04E-09	J1751-3323	2.57E-09	4.69E-09
J1638-4417	4.88E-09	4.14E-08	J1705-4331	2.94E-12	1.32E-11	J1733-3322	6.07E-11	4.87E-11	J1751-4657	2.84E-11	3.82E-11
J1638-4608	1.19E-07	4.29E-07	J1705-6135	1.40E-14	1.73E-14	J1733-3716	1.70E-08	5.03E-08	J1752+2359	4.30E-11	1.05E-10
J1638-5226	1.04E-09	3.04E-09	J1706-3839	3.10E-10	5.28E-10	J1733-4005	4.96E-10	8.83E-10	J1752-2410	3.42E-10	1.79E-09
J1639-4359	1.31E-15	2.22E-15	J1706-4310	1.12E-09	1.82E-09	J1733-5515	6.68E-13	6.60E-13	J1752-2806	2.10E-09	3.73E-09
J1639-4604	2.19E-09	8.28E-09	J1706-4434	5.43E-10	1.26E-09	J1734-0212	1.52E-12	1.81E-12	J1752-2821	3.18E-10	4.97E-10
J1640-4631	2.19E-06	1.06E-05	J1706-6118	1.23E-11	3.40E-11	J1734-2415	3.36E-11	5.49E-11	J1753-1914	7.87E-14	1.25E-12
J1640-4648	6.49E-10	3.64E-09	J1707-4053	1.34E-10	2.31E-10	J1734-2859	4.64E-15	1.54E-14	J1753-2501	6.09E-09	1.15E-08
J1640-4715	3.35E-08	6.47E-08	J1707-4341	3.24E-10	3.63E-10	J1734-3058	2.40E-15	4.43E-15	J1754+5201	6.66E-13	2.79E-13
J1640-4951	1.41E-12	1.91E-12	J1707-4417	2.95E-12	5.11E-13	J1734-3333	1.40E-06	1.20E-06	J1754-2422	2.35E-13	1.12E-13
J1641+3627C	5.91E-17	1.59E-14	J1707-4729	7.57E-10	2.84E-09	J1735+6320	4.84E-12	9.49E-12	J1754-3014	5.91E-11	4.48E-11
J1641-2347	1.32E-15	1.21E-15	J1708-3426	3.70E-10	5.34E-10	J1735-0243	4.95E-12	6.32E-12	J1754-3443	4.93E-11	1.36E-10
J1641-5317	7.72E-09	4.41E-08	J1708-3641	3.90E-13	6.63E-13	J1735-0724	1.41E-10	3.37E-10	J1754-3510	7.21E-11	1.84E-10
J1643+1338	2.37E-12	2.16E-12	J1708-3827	2.84E-10	2.32E-10	J1735-3258	3.44E-08	9.79E-08	J1755-0903	5.20E-10	2.73E-09
J1643-4505	8.36E-08	3.52E-07	J1708-4522	2.02E-11	1.56E-11	J1736-2457	3.02E-12	1.14E-12	J1755-1650	7.43E-12	1.01E-11
J1643-4522	2.00E-10	1.49E-10	J1708-7539	1.33E-11	1.11E-11	J1736-2819	3.93E-10	2.47E-10	J1755-2025	2.81E-09	8.72E-09
J1643-4550	1.04E-08	1.44E-08	J1709-1640	9.18E-10	1.41E-09	J1736-2843	1.81E-11	2.81E-12	J1755-2521	2.03E-08	1.73E-08
J1644-4559	1.45E-08	3.19E-08	J1709-3626	3.84E-10	8.58E-10	J1736-3511	1.37E-10	2.73E-10	J1755-25211	5.14E-09	5.12E-09
J1644-4657	1.30E-09	1.03E-08	J1709-3841	1.78E-09	3.03E-09	J1737-3102	1.26E-08	1.64E-08	J1755-2534	2.20E-08	9.43E-08
J1645+1012	4.49E-13	1.09E-12	J1709-4342	4.68E-13	2.70E-13	J1737-3137	2.00E-07	4.43E-07	J1755-26	7.62E-09	1.77E-08
J1645-0317	3.63E-10	9.35E-10	J1709-4401	5.73E-10	6.63E-10	J1737-3320	6.61E-11	8.10E-11	J1755-2725	3.35E-14	1.28E-13
J1646-1910	4.06E-12	8.43E-13	J1709-4429	5.61E-07	5.48E-06	J1737-3555	2.96E-09	7.45E-09	J1756+1822	3.70E-12	4.97E-12
J1646-2142	1.22E-15	2.09E-13	J1710+4923	6.58E-14	2.04E-11	J1738-2330	6.46E-11	3.26E-11	J1756-2225	6.98E-08	1.72E-07
J1646-4308	6.12E-14	7.27E-14	J1710-2616	3.22E-16	3.37E-16	J1738-2647	1.31E-09	3.75E-09	J1756-2435	1.39E-12	2.08E-12
J1646-4346	3.53E-07	1.52E-06	J1710-4148	2.73E-12	9.54E-12	J1738-2736	5.77E-10	9.19E-10	J1756-2619	2.78E-11	3.83E-11
J1646-5123	2.08E-10	3.92E-10	J1711-1509	1.19E-11	1.37E-11	J1738-2955	1.07E-07	2.41E-07	J1757-1500	1.82E-09	1.02E-08
J1646-6831	2.48E-12	1.39E-12	J1711-3826	2.82E-09	6.07E-09	J1738-3107	3.10E-12	5.64E-12	J1757-2223	5.60E-10	3.02E-09
J1647+6608	1.06E-10	6.62E-11	J1711-5350	2.02E-09	2.24E-09	J1738-3211	8.79E-12	1.14E-11	J1757-2421	2.69E-08	1.15E-07
J1647-3607	1.22E-11	5.74E-11	J1712-2715	5.95E-10	2.33E-09	J1738-3316	5.84E-14	7.99E-14	J1758+3030	3.39E-12	3.58E-12
J1648-3256	2.37E-10	3.29E-10	J1713+7810	8.23E-13	1.90E-12	J1739+0612	1.34E-11	5.71E-11	J1758-1931	4.42E-09	6.38E-09
J1648-4458	9.87E-11	1.57E-10	J1713-3844	3.04E-08	1.90E-08	J1739-1313	5.39E-15	4.43E-15	J1758-2206	8.21E-11	1.91E-10
J1648-4611	9.72E-08	5.89E-07	J1714-1054	2.49E-14	3.57E-14	J1739-2521	1.70E-14	9.37E-15	J1758-2540	1.07E-12	5.08E-13
J1648-6044	5.76E-12	9.87E-12	J1715-3247	6.36E-15	5.04E-15	J1739-2903	7.02E-09	2.17E-08	J1758-2630	1.09E-10	9.07E-11
J1649+2533	1.47E-12	1.45E-12	J1715-3700	1.57E-13	2.02E-13	J1739-3023	6.73E-08	5.88E-07	J1758-2846	5.58E-14	7.27E-14
J1649-3805	3.65E-13	1.39E-12	J1715-3859	1.73E-10	1.86E-10	J1739-3049	1.73E-09	7.23E-09	J1759-1029	1.08E-10	4.31E-11
J1649-3935	5.47E-15	7.09E-15	J1715-3903	8.08E-08	2.90E-07	J1739-3131	9.39E-09	1.77E-08	J1759-1736	5.60E-13	7.01E-13
J1649-4349	4.39E-15	5.04E-15	J1715-4034	5.54E-12	2.67E-12	J1739-3159	2.08E-13	2.37E-13	J1759-1903	1.71E-10	2.34E-10
J1649-4653	3.69E-08	6.62E-08	J1715-4254	2.83E-11	4.93E-11	J1739-3951	2.90E-14	8.49E-14	J1759-1940	3.38E-12	1.33E-11

Table A1
(Continued)

Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g
J1649-4729	6.26E-09	2.10E-08	J1716-3720	6.06E-09	9.62E-09	J1740+1000	9.46E-08	6.14E-07	J1759-1956	1.03E-10	3.62E-11
J1649-5553	8.93E-11	1.46E-10	J1716-4005	1.47E-09	4.72E-09	J1740+1311	2.79E-11	3.47E-11	J1759-2205	5.40E-09	1.17E-08
J1650-1654	1.14E-11	6.53E-12	J1716-4111	5.21E-11	5.03E-11	J1740-2540	3.68E-12	2.17E-12	J1759-2302	1.36E-09	1.68E-09
J1650-4126	4.31E-14	1.39E-13	J1716-4711	2.82E-11	5.07E-11	J1740-3015	5.43E-07	8.94E-07	J1759-2307	5.39E-10	9.65E-10
J1650-4341	2.80E-14	9.04E-14	J1717-3425	1.98E-09	3.02E-09	J1740-3327	7.15E-10	1.39E-09	J1759-2549	3.62E-08	3.78E-08
J1650-4502	1.48E-08	3.88E-08	J1717-3737	5.91E-10	8.66E-10	J1741+2758	7.93E-12	5.83E-12	J1759-2922	7.33E-10	1.28E-09
J1650-4601	8.13E-08	6.40E-07	J1717-3847	2.27E-12	1.98E-12	J1741+3855	2.89E-13	3.49E-13	J1759-3107	8.02E-11	7.44E-11
J1650-4921	3.32E-09	2.12E-08	J1717-3953	7.27E-16	6.70E-16	J1741-0840	2.99E-12	1.46E-12	J1759-5505	2.62E-11	7.02E-11
J1651-1709	7.07E-11	7.27E-11	J1717-4043	8.96E-09	2.25E-08	J1741-2019	2.66E-11	6.82E-12	J1800+5034	2.94E-13	5.08E-13
J1651-4246	2.65E-10	3.14E-10	J1717-40435	4.62E-10	1.32E-09	J1741-2054	1.36E-08	3.30E-08	J1800-0125	1.69E-09	2.16E-09
J1651-4519	2.60E-09	5.02E-09	J1717-4054	1.40E-10	1.58E-10	J1741-2719	8.21E-13	2.37E-12	J1800-2114	1.53E-13	8.49E-14
J1651-5222	9.16E-11	1.44E-10	J1717-5800	7.70E-12	2.39E-11	J1741-2733	9.39E-14	1.05E-13	J1801-0357	9.96E-11	1.08E-10
J1651-5255	4.42E-11	4.96E-11	J1718-3714	2.03E-09	1.58E-09	J1741-2945	2.37E-10	1.06E-09	J1801-0857D	3.53E-15	8.34E-13
J1651-7642	1.56E-12	8.91E-13	J1718-3718	1.88E-07	5.55E-08	J1741-3016	8.26E-11	4.36E-11	J1801-0857G	4.20E-17	8.14E-16
J1652+2651	3.07E-12	3.35E-12	J1718-3825	1.28E-07	1.72E-06	J1741-3927	1.55E-10	3.02E-10	J1801-0857H	5.49E-12	9.73E-10
J1652-1400	3.36E-14	1.10E-13	J1718-4539	1.62E-09	2.74E-09	J1742-3957	1.18E-14	1.16E-14	J1801-1417	2.59E-15	7.14E-13
J1652-2404	1.22E-11	7.13E-12	J1719-2330	3.46E-10	7.62E-10	J1742-4616	5.21E-14	1.26E-13	J1801-1855	1.71E-15	6.70E-16
J1652-4406	5.61E-13	7.27E-14	J1719-3458	2.87E-15	5.81E-15	J1743-0339	1.93E-10	4.33E-10	J1801-1909	1.82E-12	1.64E-12
J1653-3838	1.48E-09	4.84E-09	J1719-4006	1.91E-09	1.01E-08	J1743-1351	2.41E-11	5.93E-11	J1801-2115	5.42E-15	1.24E-14
J1653-4030	8.04E-13	7.88E-13	J1719-4302	8.30E-11	3.53E-10	J1743-2442	4.56E-13	3.67E-13	J1801-2154	1.52E-08	4.04E-08
J1653-4105	7.83E-14	1.57E-13	J1720+2150	4.92E-13	3.04E-13	J1743-3150	6.19E-09	2.56E-09	J1801-2304	1.75E-07	4.20E-07
J1653-4249	6.64E-10	1.08E-09	J1720-0212	2.65E-13	5.55E-13	J1743-3153	2.82E-08	1.46E-07	J1801-2451	6.44E-07	5.16E-06
J1653-4315	5.89E-15	1.41E-14	J1720-1633	6.04E-11	3.86E-11	J1743-4212	1.49E-10	4.86E-10	J1801-2920	6.00E-11	5.54E-11
J1653-4854	1.77E-12	5.78E-13	J1720-2446	2.90E-12	3.32E-12	J1744-1134	5.78E-15	1.42E-12	J1801-3458	1.93E-13	1.39E-13
J1654-2713	2.08E-13	2.63E-13	J1720-2933	1.57E-11	2.52E-11	J1744-1610	5.72E-12	3.26E-12	J1802+0128	1.85E-10	3.33E-10
J1654-3710	3.66E-12	3.90E-12	J1720-3659	9.05E-14	2.58E-13	J1744-2335	5.59E-13	3.32E-13	J1802-0523	8.58E-12	5.11E-12
J1654-4140	1.52E-14	1.20E-14	J1721-1939	1.38E-12	3.42E-12	J1744-3130	2.27E-09	2.13E-09	J1802-1745	1.59E-11	3.09E-11
J1654-4245	9.44E-09	8.57E-09	J1721-2457	3.31E-15	9.46E-13	J1744-5337	5.16E-12	1.45E-11	J1802-2426	2.23E-09	3.92E-09
J1655-3048	2.05E-14	3.78E-14	J1721-3532	4.81E-08	1.72E-07	J1745+1252	1.27E-12	1.20E-12	J1802-3346	3.91E-13	1.59E-13
J1655-3844	1.49E-11	1.25E-11	J1722-3207	2.69E-11	5.63E-11	J1745-0129	1.75E-12	1.67E-12	J1803-1616	1.44E-10	2.69E-10
J1656+6203	9.69E-12	1.25E-11	J1722-3632	1.73E-09	4.32E-09	J1745-2229	3.55E-11	3.06E-11	J1803-1857	6.54E-11	2.28E-11
J1656-3621	2.88E-11	3.95E-11	J1722-3712	2.07E-08	8.75E-08	J1745-2758	1.01E-16	2.08E-16	J1803-1920	8.18E-12	1.84E-11
J1657+3304	4.15E-12	2.65E-12	J1722-4400	9.37E-11	4.29E-10	J1745-3040	8.57E-09	2.33E-08	J1803-2137	6.44E-07	4.82E-06
J1657-4432	1.75E-09	2.87E-09	J1723-2852	2.27E-11	3.63E-11	J1745-3812	1.24E-10	1.77E-10	J1803-2149	1.32E-07	1.24E-06
J1658-4306	6.14E-09	5.26E-09	J1723-3659	1.78E-08	8.79E-08	J1746+2245	2.57E-12	7.43E-13	J1803-3002A	2.48E-14	3.49E-12
J1658-4958	1.21E-09	2.89E-09	J1724-3149	4.30E-10	4.54E-10	J1746+2540	5.37E-12	5.07E-12	J1803-3329	2.52E-12	3.98E-12
J1804-2228	5.03E-13	8.81E-13	J1821-1419	2.91E-07	1.76E-07	J1835-1106	8.18E-08	4.93E-07	J1846-0749	2.52E-10	7.20E-10
J1805+0306	5.69E-10	2.60E-09	J1821-1432	2.64E-11	1.38E-11	J1835-1548	7.16E-11	1.07E-10	J1846-07492	2.97E-10	3.45E-10
J1805-0619	7.15E-11	1.57E-10	J1822+0705	7.01E-12	5.14E-12	J1836-0436	4.06E-10	1.15E-09	J1846-7403	1.14E-12	2.34E-13
J1805-1504	1.44E-13	1.22E-13	J1822+1120	5.23E-12	2.93E-12	J1836-0517	1.26E-10	2.76E-10	J1847-0130	2.96E-08	4.41E-09
J1805-2032	4.74E-09	1.17E-08	J1822+2617	2.11E-11	3.57E-11	J1836-1008	3.94E-09	6.99E-09	J1847-0402	3.43E-08	5.74E-08
J1805-2037	4.38E-10	1.22E-09	J1822-0719	5.26E-15	1.05E-14	J1836-1324	9.91E-10	5.55E-09	J1847-0427	3.99E-15	1.54E-14
J1805-2447	5.15E-17	7.79E-17	J1822-0902	7.96E-08	5.35E-07	J1837+0053	3.90E-14	8.24E-14	J1847-0438	9.06E-10	9.45E-10
J1805-2948	1.98E-11	4.63E-11	J1822-0907	5.82E-13	5.97E-13	J1837+1221	3.31E-11	1.69E-11	J1847-0443	7.16E-14	2.10E-13
J1806+1023	1.02E-13	2.10E-13	J1822-1252	4.88E-09	2.36E-09	J1837-0045	8.64E-11	1.40E-10	J1847-0605	3.21E-10	4.13E-10
J1806-1154	9.94E-11	1.90E-10	J1822-1400	5.02E-10	2.34E-09	J1837-0559	4.95E-09	2.46E-08	J1848+0351	4.30E-12	2.25E-11
J1806-1618	1.67E-11	2.50E-11	J1822-1617	4.33E-11	5.21E-11	J1837-0604	3.23E-07	3.35E-06	J1848+0604	7.00E-12	3.15E-12
J1806-1920	2.97E-16	3.37E-16	J1822-2256	1.20E-12	6.42E-13	J1837-0653	2.84E-13	1.49E-13	J1848+0647	3.06E-09	6.06E-09
J1806-2125	1.49E-07	3.09E-07	J1822-4209	1.51E-11	3.31E-11	J1837-1243	1.37E-09	7.31E-10	J1848+0826	1.45E-11	4.40E-11
J1807+0756	8.51E-13	1.83E-12	J1823+0550	5.28E-13	7.01E-13	J1837-1837	8.24E-10	1.33E-09	J1848+1516	1.04E-12	4.64E-13
J1807-0847	1.14E-12	6.93E-12	J1823-0154	1.96E-11	2.59E-11	J1838+1523	4.13E-15	7.52E-15	J1848-0023	1.19E-10	2.21E-10
J1807-2557	6.18E-12	2.23E-12	J1823-1126	1.43E-09	7.76E-10	J1838+1650	5.66E-12	2.98E-12	J1848-0055	5.43E-10	1.98E-09
J1807-2715	1.62E-09	1.95E-09	J1823-1347	2.23E-09	3.61E-09	J1838-0107	2.86E-16	6.43E-16	J1848-0123	6.39E-10	9.69E-10
J1808-0813	1.49E-11	1.71E-11	J1823-1526	3.13E-11	1.93E-11	J1838-0453	2.04E-07	5.35E-07	J1848-0511	1.27E-10	7.75E-11
J1808-1020	1.91E-11	3.20E-11	J1823-1807	3.91E-14	2.39E-14	J1838-0537	1.52E-06	1.04E-05	J1848-0601	5.16E-11	2.29E-10
J1808-1517	3.04E-10	5.59E-10	J1823-3021A	2.21E-10	4.06E-08	J1838-0549	8.98E-08	3.82E-07	J1848-1150	5.12E-12	3.90E-12
J1808-1726	3.08E-14	1.28E-13	J1823-3021B	5.41E-14	1.43E-13	J1838-0624	1.52E-14	1.64E-14	J1848-1243	1.89E-11	4.57E-11
J1808-2057	2.26E-09	2.46E-09	J1823-3021C	4.74E-12	1.17E-11	J1838-0655	4.21E-07	5.97E-06	J1848-1414	2.13E-14	7.15E-14
J1808-2701	1.97E-09	8.01E-10	J1823-3106	1.90E-09	6.69E-09	J1838-1046	3.56E-11	2.92E-11	J1848-1952	4.22E-11	9.79E-12
J1808-3249	4.53E-09	1.24E-08	J1824-0127	5.04E-12	2.02E-12	J1838-1849	4.14E-14	8.49E-14	J1849+0106	3.36E-10	1.84E-10
J1809-0119	9.08E-11	1.22E-10	J1824-0132	3.53E-13	1.58E-12	J1839-0141	3.07E-10	3.29E-10	J1849+0127	1.68E-08	3.09E-08
J1809-0743	4.85E-12	1.54E-11	J1824-1118	9.34E-10	2.14E-09	J1839-0223	7.85E-11	6.20E-11	J1849+0409	5.32E-09	6.99E-09

Table A1
(Continued)

Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g
J1809-1429	2.71E-10	3.03E-10	J1824-1159	2.96E-09	8.17E-09	J1839-0321	2.47E-08	1.03E-07	J1849+0430	8.99E-13	2.14E-12
J1809-1850	5.47E-10	4.87E-10	J1824-1350	5.34E-13	3.82E-13	J1839-0332	6.22E-12	2.32E-12	J1849+2423	7.51E-12	2.72E-11
J1809-1917	2.18E-07	2.64E-06	J1824-1423	2.34E-11	6.50E-11	J1839-0402	2.30E-09	4.41E-09	J1849+2559	1.22E-12	2.34E-12
J1809-2004	3.21E-09	7.38E-09	J1824-1500	5.87E-11	1.42E-10	J1839-0436	9.98E-10	6.68E-09	J1849-0001	2.23E-07	5.80E-06
J1809-2109	2.95E-10	4.20E-10	J1824-1945	1.10E-08	5.82E-08	J1839-0459	3.74E-10	6.39E-10	J1849-0040	2.33E-09	3.47E-09
J1809-2332	1.68E-07	1.15E-06	J1824-2233	1.95E-13	1.68E-13	J1839-0627	7.55E-13	1.56E-12	J1849-0317	7.40E-09	1.11E-08
J1809-3547	6.46E-14	7.51E-14	J1824-2328	4.87E-12	3.23E-12	J1839-0643	8.98E-10	2.00E-09	J1849-0614	1.42E-08	1.49E-08
J1810+0705	1.40E-11	4.55E-11	J1824-2452A	2.27E-10	7.44E-08	J1839-0905	2.49E-08	5.95E-08	J1849-0636	4.12E-09	2.84E-09
J1810-1441	2.67E-13	1.23E-12	J1824-2537	1.20E-10	5.39E-10	J1839-1238	2.21E-11	1.16E-11	J1850+0026	4.00E-13	3.70E-13
J1810-1709	2.51E-13	2.17E-13	J1825+0004	1.04E-11	1.33E-11	J1840+0214	8.90E-10	1.12E-09	J1850+0423	2.04E-12	7.03E-12
J1810-1820	5.13E-12	3.34E-11	J1825-0935	2.13E-08	2.77E-08	J1840+5640	2.44E-12	1.48E-12	J1850+1335	3.57E-10	1.03E-09
J1810-5338	5.97E-11	2.29E-10	J1825-1108	2.43E-12	1.26E-12	J1840-0445	6.96E-09	1.65E-08	J1850-0006	1.02E-11	4.65E-12
J1811+0702	4.86E-10	1.05E-09	J1825-1446	4.22E-08	1.51E-07	J1840-0559	9.54E-10	1.11E-09	J1850-0026	1.67E-07	1.00E-06
J1811-0154	2.19E-11	2.36E-11	J1826-1131	1.59E-11	7.62E-12	J1840-0626	5.54E-10	2.93E-10	J1850-0031	2.78E-11	3.78E-11
J1811-1049	9.11E-14	3.47E-14	J1826-1256	6.62E-07	6.01E-06	J1840-0753	5.73E-13	1.31E-12	J1851+0118	6.35E-08	7.00E-08
J1811-1717	1.33E-12	3.39E-12	J1826-1334	4.78E-07	4.71E-06	J1840-0809	4.40E-11	4.60E-11	J1851+0233	7.19E-10	2.09E-09
J1811-1835	1.38E-09	2.48E-09	J1826-1419	1.08E-09	1.40E-09	J1840-0815	3.02E-11	2.75E-11	J1851+0241	3.41E-11	7.59E-12
J1811-1925	4.04E-07	6.24E-06	J1826-1526	1.48E-10	3.88E-10	J1840-0840	2.11E-11	3.98E-12	J1851+0418	3.36E-10	1.18E-09
J1811-2439	8.11E-12	1.95E-11	J1826-2415	1.61E-14	3.43E-12	J1840-1122	3.47E-10	3.69E-10	J1851+1259	5.30E-10	4.40E-10
J1811-4930	1.04E-11	7.28E-12	J1827-0750	7.17E-10	2.65E-09	J1840-1207	1.70E-10	2.25E-10	J1851-0029	9.97E-10	1.92E-09
J1812+0226	1.85E-10	2.33E-10	J1827-0934	2.15E-09	4.19E-09	J1840-1419	3.80E-13	5.75E-14	J1851-0053	1.24E-12	8.81E-13
J1812-1718	1.36E-09	1.13E-09	J1827-0958	4.25E-10	1.73E-09	J1841+0912	1.51E-10	3.95E-10	J1851-0114	4.98E-11	5.22E-11
J1812-1733	4.39E-11	8.15E-11	J1827-1446	3.97E-08	7.96E-08	J1841-0157	5.45E-09	8.22E-09	J1851-0241	3.72E-09	8.54E-09
J1812-1910	4.00E-08	9.28E-08	J1828+1221	4.65E-12	3.04E-12	J1841-0310	6.01E-14	3.62E-14	J1851-0633	4.24E-12	2.21E-12
J1812-20	1.38E-14	7.23E-15	J1828+1359	8.19E-12	1.10E-11	J1841-0345	2.02E-07	9.89E-07	J1852+0008	1.77E-09	3.79E-09
J1812-2102	1.97E-09	1.61E-09	J1828-0611	6.55E-10	2.43E-09	J1841-0425	1.51E-08	8.11E-08	J1852+0013	1.43E-09	1.49E-09
J1812-2526	6.63E-12	2.10E-11	J1828-1007	5.88E-10	3.84E-09	J1841-0500	7.70E-09	8.43E-09	J1852+0031	5.44E-09	2.49E-09
J1812-2748	5.34E-11	2.25E-10	J1828-1057	4.59E-08	1.86E-07	J1841-0524	3.68E-07	8.25E-07	J1852+0040	3.62E-13	3.45E-12
J1812-3039	1.44E-11	2.45E-11	J1828-1101	1.48E-07	2.05E-06	J1841-1404	7.26E-13	5.44E-13	J1852+0305	6.69E-15	5.04E-15
J1813+1822	3.78E-14	1.12E-13	J1828-1336	9.81E-12	1.14E-11	J1841-7845	3.75E-12	1.06E-11	J1852-0000	3.57E-08	1.86E-08
J1813+4013	5.66E-11	6.08E-11	J1828-2119	8.43E-11	1.64E-10	J1842+0257	2.10E-10	6.79E-11	J1852-0118	2.33E-10	5.16E-10
J1813-1246	2.34E-07	4.86E-06	J1829+0000	2.28E-10	1.15E-09	J1842+0358	3.32E-10	1.42E-09	J1852-0127	1.85E-09	4.31E-09
J1813-1749	8.21E-07	1.83E-05	J1829-0734	3.29E-09	1.03E-08	J1842+0638	1.04E-12	3.32E-12	J1852-0635	6.57E-09	1.25E-08
J1813-2113	3.74E-10	8.77E-10	J1829-1751	4.51E-09	1.47E-08	J1842+1332	2.97E-12	6.31E-12	J1852-2610	1.11E-12	3.31E-12
J1813-2242	2.94E-13	8.95E-13	J1830-0052	9.14E-12	2.64E-11	J1842-0153	2.74E-10	2.60E-10	J1853+0011	3.91E-08	9.83E-08
J1814+1130	4.57E-11	6.09E-11	J1830-0131	4.38E-09	2.87E-08	J1842-0309	1.70E-09	4.20E-09	J1853+0029	4.76E-12	2.53E-12
J1814-0521	4.24E-12	4.18E-12	J1830-1059	8.25E-08	2.04E-07	J1842-0359	1.14E-13	6.18E-14	J1853+0056	3.99E-08	1.45E-07
J1814-0618	9.09E-14	6.60E-14	J1830-1135	5.87E-11	9.43E-12	J1842-0415	1.23E-08	2.33E-08	J1853+0259	2.53E-13	4.32E-13
J1814-1649	3.23E-10	3.37E-10	J1830-1313	4.97E-11	6.65E-11	J1842-0612	4.55E-15	8.06E-15	J1853+0427	1.96E-11	1.49E-11
J1814-1744	4.09E-08	1.03E-08	J1830-1414	3.17E-14	4.10E-14	J1842-0800	4.66E-14	3.71E-14	J1853+0505	1.44E-11	1.59E-11
J1815+5546	5.59E-13	1.31E-12	J1831-0823	2.34E-12	3.82E-12	J1842-0905	9.50E-09	2.76E-08	J1853+0545	9.27E-10	7.33E-09
J1815-1738	2.84E-07	1.43E-06	J1831-0952	8.94E-08	1.33E-06	J1843+0119	4.78E-11	3.77E-11	J1853+0853	1.79E-12	4.57E-13
J1815-1910	3.91E-09	3.13E-09	J1831-1223	6.76E-12	2.37E-12	J1843+2024	5.57E-14	1.64E-14	J1853-0004	3.39E-08	3.34E-07
J1816-0755	1.15E-08	5.30E-08	J1831-1329	4.56E-12	2.10E-12	J1843-0000	6.04E-10	6.86E-10	J1853-0649	1.33E-11	1.27E-11
J1816-1446	5.96E-11	1.00E-10	J1831-1423	6.54E-11	1.29E-10	J1843-0050	5.72E-13	7.31E-13	J1854+0050	4.34E-12	5.65E-12
J1816-1729	7.34E-10	9.38E-10	J1832+0029	1.13E-10	2.12E-10	J1843-0137	1.45E-10	2.16E-10	J1854+0306	1.57E-09	3.45E-10
J1816-2650	6.59E-14	1.11E-13	J1832-0644	1.34E-08	1.80E-08	J1843-0211	1.78E-10	8.77E-11	J1854+0317	7.88E-12	5.77E-12
J1816-5643	4.13E-16	1.90E-15	J1832-0827	4.01E-08	6.19E-08	J1843-0355	1.97E-09	1.49E-08	J1854+0319	3.22E-14	5.12E-14
J1817-1511	9.92E-10	4.42E-09	J1832-0836	2.06E-14	7.59E-12	J1843-0408	8.53E-11	1.09E-10	J1854+1050	1.46E-11	2.54E-11
J1817-1742	9.36E-08	6.25E-07	J1832-1021	2.44E-09	7.38E-09	J1843-0459	1.09E-11	1.45E-11	J1854-0524	6.39E-11	1.17E-10
J1817-1938	2.97E-14	1.45E-14	J1833-0209	1.61E-09	5.51E-09	J1843-0510	3.47E-10	5.17E-10	J1854-1421	8.12E-11	7.08E-11
J1817-3618	4.61E-10	1.19E-09	J1833-0338	1.89E-08	2.75E-08	J1843-0702	2.77E-09	1.44E-08	J1854-1557	2.13E-12	6.16E-13
J1817-3837	4.23E-11	1.10E-10	J1833-0556	2.30E-12	1.51E-12	J1843-0744	6.99E-09	1.47E-08	J1855+0205	1.67E-12	6.75E-12
J1818-0151	9.27E-10	1.11E-09	J1833-0559	5.98E-09	1.24E-08	J1843-0806	8.20E-09	1.53E-08	J1855+0306	7.84E-11	4.80E-11
J1818-1116	5.95E-10	1.09E-09	J1833-0827	7.60E-08	8.91E-07	J1843-1113	1.02E-13	5.51E-11	J1855+0307	3.08E-09	3.64E-09
J1818-1422	9.63E-10	3.30E-09	J1833-1034	1.04E-06	1.68E-05	J1843-1448	7.67E-16	1.40E-13	J1855+0422	7.40E-13	4.41E-13
J1818-1448	6.39E-09	2.27E-08	J1833-1055	6.85E-12	1.08E-11	J1843-1507	1.55E-09	2.66E-09	J1855+0527	7.44E-08	5.34E-08
J1818-1519	1.45E-10	1.55E-10	J1833-3840	3.44E-13	1.84E-10	J1844+1454	4.33E-10	1.15E-09	J1855+0700	2.19E-10	8.47E-10
J1818-1541	2.96E-09	5.38E-09	J1833-6023	1.97E-14	1.04E-14	J1844-0030	9.00E-10	1.40E-09	J1855-0941	9.43E-12	2.73E-11
J1818-1556	3.18E-12	3.34E-12	J1834-0031	4.02E-11	1.22E-10	J1844-0244	8.72E-09	1.72E-08	J1856+0102	4.42E-11	7.13E-11
J1819+1305	4.32E-13	4.07E-13	J1834-0426	1.20E-12	4.14E-12	J1844-0302	2.53E-10	2.11E-10	J1856+0113	5.61E-07	2.10E-06
J1819-0925	1.13E-10	1.33E-10	J1834-0602	2.02E-10	4.14E-10	J1844-0310	3.65E-09	6.95E-09	J1856+0245	4.67E-07	5.78E-06

Table A1
(Continued)

Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g
J1819-1008	4.10E-10	1.36E-09	J1834-0633	8.13E-11	2.56E-10	J1844-0346	7.83E-07	6.94E-06	J1856+0404	6.08E-14	1.45E-13
J1819-1114	8.92E-11	3.03E-10	J1834-0731	5.36E-08	1.04E-07	J1844-0433	1.12E-10	1.13E-10	J1856+0912	3.35E-12	1.54E-12
J1819-1131	9.45E-13	6.81E-13	J1834-0742	9.58E-09	1.22E-08	J1844-0452	1.63E-10	6.04E-10	J1856-0526	3.75E-10	1.01E-09
J1819-1318	3.73E-13	2.46E-13	J1834-0812	4.07E-09	8.29E-09	J1844-0502	5.01E-13	1.49E-12	J1857+0057	2.95E-13	8.27E-13
J1819-1408	6.55E-12	3.66E-12	J1834-1202	1.17E-16	1.92E-16	J1844-0538	1.52E-08	5.96E-08	J1857+0143	1.60E-07	1.15E-06
J1819-1458	2.18E-08	5.12E-09	J1834-1710	2.02E-13	5.63E-13	J1845+0623	3.84E-13	2.70E-13	J1857+0210	4.02E-09	6.38E-09
J1819-1510	1.47E-14	6.49E-14	J1834-1855	6.80E-12	4.64E-12	J1845-0316	1.96E-08	9.43E-08	J1857+0212	4.66E-08	1.12E-07
J1819-1717	1.15E-09	2.92E-09	J1835-0349	1.12E-10	1.33E-10	J1845-0434	5.12E-09	1.05E-08	J1857+0300	1.09E-10	1.41E-10
J1820-0427	1.16E-09	1.94E-09	J1835-0522	7.63E-13	7.01E-13	J1845-0545	9.30E-10	8.51E-10	J1857+0526	4.83E-09	1.38E-08
J1820-0509	1.58E-10	4.68E-10	J1835-0600	4.27E-11	1.92E-11	J1845-0635	2.54E-09	7.46E-09	J1857+0809	1.08E-09	2.14E-09
J1820-1346	1.85E-10	2.00E-10	J1835-0643	7.73E-08	2.53E-07	J1845-0743	6.11E-10	5.84E-09	J1857-1027	1.22E-11	3.32E-12
J1820-1529	6.21E-08	1.86E-07	J1835-0847	2.05E-12	2.42E-12	J1845-0826	1.99E-09	3.13E-09	J1858+0215	3.57E-10	4.79E-10
J1820-1818	1.73E-12	5.57E-12	J1835-0924	3.94E-09	4.58E-09	J1845-1114	2.12E-09	1.03E-08	J1858+0239	3.92E-08	1.98E-07
J1821+0155	1.72E-17	5.09E-16	J1835-09242	3.56E-14	1.51E-13	J1845-1351	3.36E-11	1.28E-11	J1858+0241	3.46E-11	7.37E-12
J1821+1715	1.38E-12	1.01E-12	J1835-0928	2.71E-11	4.36E-11	J1846+0051	6.50E-09	1.50E-08	J1858+0319	4.18E-14	4.82E-14
J1821+4147	8.96E-12	7.10E-12	J1835-0944	1.39E-08	9.56E-08	J1846+0919	1.98E-08	8.77E-08	J1858+0346	1.31E-09	5.12E-09
J1821-0256	6.50E-14	1.57E-13	J1835-0946	1.33E-13	3.49E-13	J1846-0257	2.01E-09	4.49E-10	J1858-0736	9.63E-10	1.75E-09
J1821-0331	6.16E-11	6.83E-11	J1835-1020	5.16E-09	1.71E-08	J1846-0258	6.13E-06	1.88E-05	J1859+0345	4.60E-13	3.04E-13
J1859+0601	3.31E-09	3.17E-09	J1909+1148	2.44E-13	5.43E-13	J1923+2515	8.83E-15	2.33E-12	J1949+2306	1.14E-14	8.61E-15
J1859+0603	1.37E-10	2.69E-10	J1909+1205	4.26E-11	3.47E-11	J1923+4243	2.14E-10	3.60E-10	J1949+3426	4.39E-12	1.13E-11
J1859+1526	1.35E-10	1.45E-10	J1909+1450	1.64E-13	1.64E-13	J1923-0408	4.19E-15	3.65E-15	J1949-2524	8.66E-11	9.05E-11
J1859+7654	7.57E-16	5.43E-16	J1909+1859	2.39E-13	4.41E-13	J1924+1628	1.34E-11	3.57E-11	J1950+3001	6.23E-09	2.23E-09
J1900+0227	3.03E-09	8.10E-09	J1910+0225	1.23E-11	3.63E-11	J1924+1631	2.53E-08	8.61E-09	J1951+1123	1.65E-13	3.24E-14
J1900+0438	1.79E-09	5.74E-09	J1910+0358	8.85E-12	3.80E-12	J1924+1639	5.48E-09	3.47E-08	J1951+4724	1.13E-07	6.19E-07
J1900+0634	2.31E-09	5.92E-09	J1910+0435	5.02E-09	7.55E-09	J1924+1713	9.22E-14	1.22E-13	J1952+1410	5.20E-12	1.89E-11
J1900-0051	2.06E-12	5.36E-12	J1910+0517	1.28E-10	4.15E-10	J1924+1917	4.63E-14	3.62E-14	J1952+2513	5.23E-12	4.85E-12
J1900-0134	1.04E-09	5.69E-10	J1910+0534	2.74E-10	6.05E-10	J1924+2040	1.64E-09	6.91E-09	J1952+3021	1.81E-10	1.09E-10
J1900-0933	4.09E-14	2.88E-14	J1910+0710	1.44E-12	2.68E-12	J1925+1720	9.99E-08	1.32E-06	J1952+3252	1.05E-07	2.65E-06
J1900-2600	8.98E-13	1.47E-12	J1910+0714	1.06E-11	3.89E-12	J1926+0431	3.33E-11	3.10E-11	J1953+1149	9.49E-11	1.11E-10
J1900-7951	1.01E-11	7.87E-12	J1910+0728	7.50E-09	2.30E-08	J1926+0737	3.12E-11	9.81E-11	J1953+2732	7.81E-12	5.85E-12
J1901+0124	1.72E-09	5.39E-09	J1910+1017	2.23E-09	5.43E-09	J1926+1434	5.12E-14	3.86E-14	J1953+2819	3.01E-11	2.98E-11
J1901+0156	1.27E-09	4.42E-09	J1910+1026	3.29E-07	6.19E-07	J1926+1614	1.60E-13	5.18E-13	J1954+1021	1.42E-12	6.75E-13
J1901+0234	4.15E-09	4.69E-09	J1910+1231	1.61E-10	1.12E-10	J1926+1648	7.32E-09	1.26E-08	J1954+2407	8.48E-10	4.38E-09
J1901+0254	3.51E-13	2.70E-13	J1910-0112	2.64E-14	1.94E-14	J1926+1928	4.64E-12	3.45E-12	J1954+2836	1.65E-07	1.78E-06
J1901+0320	6.63E-12	1.04E-11	J1910-0309	2.60E-10	5.15E-10	J1926+2016	2.27E-09	7.59E-09	J1954+2923	1.18E-17	2.77E-17
J1901+0331	1.23E-09	1.87E-09	J1910-0556	1.38E-11	2.47E-11	J1926-0652	1.01E-13	6.30E-14	J1954+3852	4.39E-09	1.24E-08
J1901+0355	4.62E-09	8.32E-09	J1910-5959C	5.82E-17	1.10E-14	J1926-1314	7.47E-11	1.54E-11	J1954+4357	1.11E-11	7.99E-12
J1901+0413	5.62E-09	2.11E-09	J1910-5959D	8.41E-12	9.31E-10	J1927+0911	9.02E-13	3.11E-12	J1955+2527	3.10E-15	6.36E-13
J1901+0435	1.41E-09	2.04E-09	J1910-5959F	6.11E-12	7.20E-10	J1927+1852	5.71E-13	1.18E-12	J1955+2930	6.40E-11	5.96E-11
J1901+0459	2.19E-09	2.49E-09	J1911+0921	5.18E-14	1.89E-13	J1927+1856	1.08E-09	3.61E-09	J1955+5059	9.64E-11	1.86E-10
J1901+0510	1.52E-08	2.48E-08	J1911+0925	1.93E-09	5.95E-09	J1927+2234	8.68E-13	6.06E-13	J1955+6708	7.46E-16	8.70E-14
J1901+0511	4.06E-11	8.83E-12	J1911+1051	3.46E-08	1.81E-07	J1928+1443	1.39E-13	1.38E-13	J1956+0838	1.19E-11	3.91E-11
J1901+0621	4.52E-16	5.43E-16	J1911+1301	2.31E-11	2.29E-11	J1928+1746	1.38E-07	2.01E-06	J1957+2831	1.74E-09	5.66E-09
J1901+0716	1.40E-10	2.17E-10	J1911+1336	6.17E-12	2.06E-11	J1928+1923	5.07E-10	6.20E-10	J1957+5033	4.30E-09	1.15E-08
J1901+1306	3.11E-15	1.70E-15	J1911+1347	1.60E-14	3.47E-12	J1928-0108	2.82E-12	1.19E-12	J1957-0002	4.10E-12	4.24E-12
J1901-0125	4.21E-13	1.51E-10	J1911+1758	2.78E-15	6.04E-15	J1929+1357	1.47E-10	1.70E-10	J1958+2846	5.28E-07	1.82E-06
J1901-0312	7.19E-10	2.02E-09	J1912+1036	1.24E-08	3.04E-08	J1929+1844	1.99E-11	1.63E-11	J1958+3033	2.25E-10	2.05E-10
J1901-0315	9.16E-11	1.14E-10	J1912+2104	6.30E-11	2.82E-11	J1929+1955	1.90E-09	7.36E-09	J1959+3620	6.45E-14	1.59E-13
J1901-0906	2.29E-12	1.29E-12	J1912+2525	1.06E-12	1.71E-12	J1929+2121	8.62E-11	1.19E-10	J2000+2920	3.45E-10	1.12E-10
J1901-1740	3.00E-13	1.53E-13	J1913+0446	5.94E-08	3.68E-08	J1929+3817	3.98E-12	4.89E-12	J2001+4258	4.21E-09	5.85E-09
J1902+0235	6.19E-13	1.49E-12	J1913+0523	7.95E-11	1.20E-10	J1930+1316	2.17E-10	2.85E-10	J2001-0349	8.12E-15	6.04E-15
J1902+0248	2.06E-11	1.68E-11	J1913+0657	2.68E-11	2.13E-11	J1930+1408	1.63E-17	3.84E-17	J2002+1637	1.68E-11	6.08E-11
J1902+0556	2.31E-09	3.10E-09	J1913+0832	1.68E-08	1.25E-07	J1930+1722	7.62E-13	4.74E-13	J2002+3217	7.06E-08	1.01E-07
J1902+0615	1.22E-09	1.80E-09	J1913+0904	6.95E-08	4.26E-07	J1930+1852	2.00E-06	1.46E-05	J2002+4050	2.77E-11	3.07E-11
J1902+0723	2.16E-12	4.42E-12	J1913+0936	3.66E-13	2.95E-13	J1931+1439	4.80E-11	2.70E-11	J2003+2916	4.60E-13	4.55E-13
J1902+1141	6.24E-10	1.53E-09	J1913+1000	2.75E-09	3.28E-09	J1931+1536	3.65E-09	1.16E-08	J2004+2653	2.73E-14	4.10E-14
J1902-0340	6.40E-12	4.20E-12	J1913+1011	6.78E-08	1.89E-06	J1931+1817	3.32E-07	1.42E-06	J2004+3137	3.70E-09	1.75E-09
J1902-1036	7.74E-10	9.84E-10	J1913+1050	3.97E-11	2.09E-10	J1931+1952	3.54E-13	7.06E-13	J2004+3429	6.10E-07	2.53E-06
J1903+0135	2.93E-10	4.02E-10	J1913+11025	6.43E-13	6.96E-13	J1931-0144	7.83E-15	1.32E-14	J2005+3547	1.84E-12	3.00E-12
J1903+0415	9.93E-14	8.63E-14	J1913+1145	3.87E-09	1.26E-08	J1932+1059	6.73E-10	2.97E-09	J2005+3552	1.63E-09	5.29E-09
J1903+0601	1.99E-08	5.32E-08	J1913+1330	6.51E-10	7.05E-10	J1932+1916	3.24E-07	1.56E-06	J2005-0020	3.98E-10	1.74E-10
J1903+0654	1.42E-09	1.79E-09	J1913+1400	3.20E-11	6.14E-11	J1932+2020	3.92E-09	1.46E-08	J2006+3102	1.04E-07	6.33E-07

Table A1
(Continued)

Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g	Pulsar	a_g	A_g
J1903+0912	5.50E-08	3.31E-07	J1913+3732	2.07E-11	2.43E-11	J1932+2220	2.87E-07	1.99E-06	J2006+4058	3.94E-12	7.88E-12
J1903+0925	5.36E-08	1.50E-07	J1913-0440	2.09E-10	2.53E-10	J1932-3655	2.50E-12	4.38E-12	J2006-0807	2.81E-14	4.83E-14
J1903+2225	4.29E-12	6.59E-12	J1914+0219	7.74E-11	1.69E-10	J1933+0758	3.47E-12	7.93E-12	J2007+0809	3.39E-12	1.04E-11
J1903-0258	1.18E-10	3.92E-10	J1914+0625	1.53E-12	1.74E-12	J1933+1304	5.37E-13	5.79E-13	J2007+0910	7.45E-12	1.62E-11
J1903-0632	8.74E-10	2.02E-09	J1914+0631	5.59E-15	8.06E-15	J1933+2421	8.10E-10	9.95E-10	J2007+2722	4.10E-13	1.67E-11
J1903-0848	1.67E-11	1.88E-11	J1914+0659	3.03E-16	1.64E-14	J1933+5335	7.11E-13	3.47E-13	J2007+3120	5.22E-09	8.58E-09
J1904+0004	3.65E-11	2.62E-10	J1914+0805	2.62E-14	5.76E-14	J1934+1926	7.86E-16	3.40E-15	J2008+2513	9.05E-10	1.54E-09
J1904+0056	1.29E-16	2.95E-16	J1914+0838	2.84E-11	6.46E-11	J1934+2352	5.14E-07	2.88E-06	J2008+3139	3.87E-12	1.71E-11
J1904+0451	4.02E-16	6.60E-14	J1914+1122	1.32E-11	2.19E-11	J1934+5219	1.40E-13	2.46E-13	J2008+3758	6.87E-15	1.58E-15
J1904+0738	1.27E-10	6.09E-10	J1914+1428	1.99E-11	1.72E-11	J1935+1159	4.41E-13	2.27E-13	J2009+3326	3.89E-12	2.70E-12
J1904+0800	3.24E-08	1.23E-07	J1915+0227	1.97E-11	6.21E-11	J1935+1616	3.63E-09	1.01E-08	J2010+2845	1.72E-13	3.05E-13
J1904+1011	2.22E-14	1.20E-14	J1915+0639	9.10E-11	1.41E-10	J1935+1745	2.92E-12	4.46E-12	J2010+3230	2.88E-11	2.00E-11
J1904-0150	1.03E-10	2.72E-10	J1915+0738	1.89E-11	1.23E-11	J1935+1829	6.35E-11	7.53E-11	J2010-1323	4.90E-16	9.38E-14
J1904-1224	8.18E-12	1.09E-11	J1915+0752	2.19E-15	1.06E-15	J1935+2025	4.62E-07	5.77E-06	J2011+3331	2.67E-11	2.87E-11
J1904-1629	1.75E-11	1.14E-11	J1915+0838	4.01E-10	1.17E-09	J1936+1536	1.29E-10	1.33E-10	J2012-2029	1.24E-11	2.28E-11
J1905+0400	1.83E-15	4.82E-13	J1915+1009	1.21E-08	3.00E-08	J1936+2042	5.13E-09	3.69E-09	J2013+3058	7.41E-12	2.68E-11
J1905+0600	1.03E-10	2.33E-10	J1915+1145	2.15E-13	1.24E-12	J1937+1505	7.03E-12	2.45E-12	J2013+3845	1.62E-08	7.05E-08
J1905+0616	5.31E-08	5.37E-08	J1915+1150	9.72E-08	9.71E-07	J1937+2544	3.22E-10	1.60E-09	J2013-0649	1.23E-11	2.12E-11
J1905+0709	5.99E-10	9.24E-10	J1915+1410	4.50E-13	1.51E-12	J1937+2950	1.66E-11	1.00E-11	J2015+2524	4.46E-14	1.94E-14
J1905+0902	4.54E-09	2.08E-08	J1915+1647	1.09E-13	6.73E-14	J1938+0650	1.64E-10	1.46E-10	J2017+2043	4.54E-11	8.46E-11
J1905+1034	5.88E-10	3.40E-10	J1916+0748	3.66E-09	6.75E-09	J1938+2010	2.51E-10	3.65E-10	J2017+3625	1.82E-09	1.09E-08
J1905-0056	2.47E-10	3.85E-10	J1916+0844	6.33E-10	1.44E-09	J1938+2213	1.83E-07	1.10E-06	J2017+5906	4.73E-12	1.17E-11
J1906+0414	7.84E-10	7.51E-10	J1916+0852	1.15E-10	5.29E-11	J1938+2659	1.08E-10	1.22E-10	J2018+2839	5.92E-13	1.06E-12
J1906+0509	2.27E-09	5.71E-09	J1916+0951	1.66E-09	6.14E-09	J1939+2134	1.40E-11	8.96E-09	J2018+3431	3.84E-10	9.91E-10
J1906+0641	1.29E-09	4.83E-09	J1916+1023	3.98E-13	2.46E-13	J1939+2449	5.91E-09	9.16E-09	J2021+3651	5.70E-07	5.50E-06
J1906+0649	2.23E-14	1.73E-14	J1916+1030	9.12E-15	1.45E-14	J1939+2609	1.97E-16	4.22E-16	J2021+4026	1.37E-07	5.15E-07
J1906+0722	2.32E-07	2.08E-06	J1916+1225	6.10E-08	2.68E-07	J1940+2245	2.18E-08	8.43E-08	J2022+2854	5.60E-10	1.63E-09
J1906+0724	1.55E-11	1.01E-11	J1916+1312	2.79E-09	9.91E-09	J1940+2337	6.99E-08	1.28E-07	J2022+3842	6.76E-07	1.39E-05
J1906+0912	1.26E-13	1.62E-13	J1916+3224	5.71E-11	5.02E-11	J1940-0902	2.54E-11	2.59E-11	J2022+5154	4.27E-10	8.07E-10
J1906+1854	1.27E-13	1.24E-13	J1916-2939	4.42E-12	3.54E-12	J1941+0121	2.55E-11	1.17E-10	J2023+5037	7.52E-10	2.02E-09
J1907+0249	2.04E-10	5.80E-10	J1917+0834	2.26E-10	1.06E-10	J1941+1026	8.26E-12	9.12E-12	J2027+0255	1.09E-14	1.03E-12
J1907+0255	1.06E-12	1.71E-12	J1917+1353	1.65E-08	8.46E-08	J1941+1341	6.27E-11	1.12E-10	J2027+2146	4.07E-12	1.02E-11
J1907+0345	1.35E-08	5.62E-08	J1917+1737	1.97E-11	5.87E-11	J1941+2525	1.14E-08	4.93E-09	J2027+4557	2.60E-13	2.36E-13
J1907+0534	4.65E-11	4.08E-11	J1917+2224	6.73E-10	1.58E-09	J1941+4320	1.45E-11	1.72E-11	J2027+7502	4.10E-11	7.96E-11
J1907+0602	5.20E-07	4.88E-06	J1918+1311	5.72E-11	6.68E-11	J1941-2602	9.96E-11	2.47E-10	J2028+3332	1.13E-08	6.37E-08
J1907+0631	9.75E-07	3.01E-06	J1918+1444	7.30E-08	6.18E-08	J1942+1743	9.83E-14	1.41E-13	J2029+3744	5.86E-10	4.82E-10
J1907+0731	1.98E-08	5.43E-08	J1918+1541	7.77E-10	2.10E-09	J1942+3941	2.30E-15	1.70E-15	J2030+2228	2.14E-11	3.39E-11
J1907+0740	1.61E-11	2.80E-11	J1918-1052	9.28E-12	1.16E-11	J1942+8106	9.23E-13	4.54E-12	J2030+3641	1.35E-08	6.77E-08
J1907+0833	8.38E-09	5.00E-08	J1919+0021	2.04E-10	1.61E-10	J1942-2019	2.10E-14	7.63E-14	J2030+4415	1.06E-08	4.68E-08
J1907+0859	5.95E-11	3.90E-11	J1919+0134	2.88E-13	1.79E-13	J1943+0609	1.68E-11	3.77E-11	J2033+0042	3.22E-12	6.43E-13
J1907+0918	3.01E-07	1.33E-06	J1919+1314	5.14E-10	9.00E-10	J1943+5815	2.93E-13	2.31E-13	J2033-1938	3.68E-13	2.87E-13
J1907+1149	3.32E-08	2.34E-08	J1919+1645	1.39E-12	2.47E-12	J1943-1237	1.97E-11	2.03E-11	J2036+2835	1.06E-11	7.79E-12
J1907+1247	4.71E-11	5.69E-11	J1919+1745	1.40E-12	6.75E-13	J1944+0907	1.12E-14	2.16E-12	J2036+6646	4.98E-11	9.91E-11
J1907+4002	6.46E-13	5.23E-13	J1919+2621	6.74E-12	1.03E-11	J1944+1755	2.04E-13	1.02E-13	J2037+1942	2.18E-12	1.05E-12
J1907-1532	2.64E-10	4.17E-10	J1920+1040	2.42E-11	1.09E-11	J1944+2236	5.88E-15	1.62E-12	J2037+3621	5.71E-10	9.23E-10
J1908+0457	1.01E-11	1.19E-11	J1920+1110	9.33E-13	1.83E-12	J1944-1750	1.04E-11	1.23E-11	J2038+5319	1.43E-12	1.01E-12
J1908+0500	1.46E-09	5.01E-09	J1920+2650	3.55E-15	4.51E-15	J1945+1211	3.86E-13	8.11E-14	J2038-3816	2.90E-11	1.84E-11
J1908+0558	4.02E-09	2.38E-08	J1920-0950	5.83E-13	5.62E-13	J1945+1834	1.58E-13	1.48E-13	J2039-3616	1.12E-14	3.44E-12
J1908+0734	4.36E-10	2.06E-09	J1921+0812	9.31E-09	4.42E-08	J1945-0040	1.18E-12	1.13E-12	J2040+1657	3.03E-12	3.50E-12
J1908+0833	2.06E-10	4.03E-10	J1921+0921	2.78E-09	4.94E-09	J1946+1805	1.67E-14	3.79E-14	J2043+2740	5.12E-09	5.33E-08
J1908+0839	3.54E-09	1.91E-08	J1921+1419	8.54E-10	1.38E-09	J1946+2244	1.58E-12	1.19E-12	J2044+4614	5.70E-13	4.09E-13
J1908+0909	5.48E-08	1.63E-07	J1921+1544	1.50E-09	1.04E-08	J1946+2535	1.38E-09	2.68E-09	J2045+0912	3.83E-12	9.67E-12
J1908+0916	4.29E-14	5.17E-14	J1921+1630	3.44E-09	3.67E-09	J1946+2611	1.81E-08	4.16E-08	J2046+1540	5.96E-14	5.24E-14
J1908+1351	1.81E-12	5.70E-13	J1921+1948	9.12E-12	1.11E-11	J1946-1312	2.31E-10	4.70E-10	J2046+5708	5.21E-09	1.09E-08
J1908+2351	1.28E-14	3.40E-14	J1921+2003	1.12E-14	1.47E-14	J1946-2913	1.64E-11	1.71E-11	J2046-0421	3.00E-12	1.94E-12
J1909+0007	2.07E-10	2.03E-10	J1921+2153	4.15E-12	3.11E-12	J1947+0915	2.35E-13	1.59E-13	J2047+5029	1.17E-09	2.62E-09
J1909+0254	2.25E-10	2.27E-10	J1921-0510	4.23E-12	5.32E-12	J1947+1957	4.16E-10	2.64E-09	J2048+2255	3.11E-14	1.10E-13
J1909+0616	4.99E-09	6.61E-09	J1922+1131	6.95E-15	1.24E-14	J1948+1808	5.39E-12	1.37E-11	J2048+4951	9.59E-10	1.69E-09
J1909+0641	1.81E-10	2.45E-10	J1922+1733	2.76E-08	1.17E-07	J1948+2333	5.72E-09	1.08E-08	J2048-1616	1.12E-10	5.69E-11
J1909+0749	4.62E-07	1.95E-06	J1922+2018	1.22E-12	1.04E-12	J1948+2551	2.21E-08	1.12E-07	J2050+1259	5.71E-13	4.67E-13
J1909+0912	1.05E-07	4.72E-07	J1922+2110	3.77E-10	3.50E-10	J1948+2819	1.82E-08	1.95E-08	J2051+1248	3.34E-15	6.04E-15
J1909+1102	1.60E-09	5.65E-09	J1923+1706	3.04E-14	5.56E-14	J1948+3540	8.79E-10	1.23E-09	J2053+1718	3.12E-17	2.61E-16

Pulsar	a_g	A_g
J2053+4718	9.49E-12	1.93E-12
J2053-7200	6.47E-12	1.89E-11
J2055+15	2.89E-13	1.34E-10
J2055+2209	2.24E-11	2.75E-11
J2055+2539	2.51E-09	7.86E-09
J2055+3630	8.80E-11	3.97E-10
J2057+4701	4.35E-08	7.78E-08
J2105+6223	1.31E-11	5.67E-12
J2108+4441	4.97E-13	1.20E-12
J2108-3429	2.81E-11	1.98E-11
J2111+2106	5.53E-13	1.40E-13
J2111+4606	6.09E-07	3.86E-06
J2112+4058	3.28E-12	8.07E-13
J2113+2754	2.63E-11	2.19E-11
J2113+4644	2.60E-12	2.57E-12
J2116+1414	6.32E-12	1.44E-11
J2116+3701	1.77E-08	1.22E-07
J2122+2426	4.52E-13	8.34E-13
J2123+5434	3.37E-18	2.43E-17
J2124+1407	1.15E-11	1.66E-11
J2124-3358	1.99E-14	4.04E-12
J2127-6648	1.01E-11	3.09E-11
J2129+1210B	3.63E-12	6.46E-11
J2129+1210E	2.18E-12	4.69E-10
J2129+1210F	1.09E-13	2.70E-11
J2129+1210G	4.70E-13	1.25E-11
J2129+1210H	9.23E-15	1.37E-12
J2129+4119	1.37E-15	8.14E-16
J2136-1606	4.87E-17	3.97E-17
J2136-5046	2.44E-12	9.14E-12
J2137+6428	1.33E-11	7.61E-12
J2139+2242	9.80E-12	9.04E-12
J2139+4716	8.26E-10	2.92E-09
J2144-3933	9.02E-17	1.06E-17
J2149+6329	3.15E-12	8.27E-12
J2150+5247	9.70E-09	2.92E-08
J2151+2315	1.62E-11	2.73E-11
J2154-2812	6.37E-13	4.74E-13
J2155+2813	8.41E-13	5.23E-13
J2155-3118	8.63E-12	8.38E-12
J2155-5641	4.72E-11	3.44E-11
J2156+2618	2.40E-15	4.81E-15
J2157+4017	2.13E-11	1.40E-11
J2205+1444	5.83E-12	6.21E-12
J2206+6151	3.34E-11	1.04E-10
J2208+4056	7.09E-10	1.11E-09
J2208+5500	4.20E-10	4.50E-10
J2212+2933	1.15E-12	1.14E-12
J2215+1538	6.69E-10	1.79E-09
J2215+4524	8.36E-12	3.07E-12
J2216+5759	9.38E-08	2.24E-07
J2217+5733	1.78E-12	1.68E-12
J2219+4754	3.36E-10	6.24E-10
J2222+2923	3.14E-15	1.11E-14
J2225+6535	1.75E-09	2.57E-09
J2228+6447	2.04E-13	1.08E-13
J2229+6114	6.36E-07	1.23E-05
J2229+6205	3.92E-10	8.84E-10
J2234+2114	4.72E-14	3.47E-14
J2235+1506	1.43E-16	2.39E-15
J2237+2828	2.82E-12	2.62E-12
J2238+5903	4.23E-07	2.60E-06

Table A1
(Continued)

Pulsar	a_g	A_g
J2240+5832	7.29E-08	5.21E-07
J2241+6941	8.25E-11	9.64E-11
J2242+6950	3.34E-11	2.00E-11
J2243+1518	2.37E-13	3.96E-13
J2248-0101	2.81E-11	5.89E-11
J2251-3711	1.93E-13	1.59E-14
J2253+1516	1.99E-14	2.51E-14
J2257+5909	3.19E-09	8.66E-09
J2302+6028	1.51E-11	1.25E-11
J2305+3100	1.31E-11	8.30E-12
J2307+2225	4.36E-16	8.14E-16
J2308+5547	2.12E-12	4.47E-12
J2310+6706	4.98E-16	2.56E-16
J2312+6931	4.28E-12	5.26E-12
J2313+4253	1.71E-12	4.89E-12
J2317+2149	1.74E-12	1.20E-12
J2319+6411	1.88E-11	8.69E-11
J2321+6024	2.73E-11	1.21E-11
J2322+2057	3.74E-15	7.79E-13
J2323+1214	1.63E-13	4.33E-14
J2324-6054	2.40E-12	1.02E-12
J2325+6316	1.71E-11	1.19E-11
J2325-0530	1.02E-11	1.18E-11
J2326+6113	6.91E-11	2.96E-10
J2329+4743	5.93E-16	8.14E-16
J2330-2005	3.18E-11	1.94E-11
J2333+6145	2.16E-11	2.85E-11
J2337+6151	2.60E-07	5.24E-07
J2346-0609	6.61E-12	5.59E-12
J2351+8533	4.25E-12	4.20E-12
J2354+6155	1.93E-09	2.04E-09
J2355+1523	5.56E-13	5.08E-13
J2355+2246	1.39E-11	7.54E-12

Note. a_g is in unit of yr^{-1} and A_g is in unit of Hz yr^{-1}.

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