A FEW REMARKS ON THE TWO TYPES OF PULSARS

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Huang et al have classified pulsars into two types according to the role played by the superfluid neutron vortexes in the interior of neutron stars. They have also presented the formule of $\dot{P}$ for these two types of pulsars. In this short remark, we shall compare the conclusions about the evolutions of these two types of pulsars with the observational distributions. The consequences obtained are summarized as follws:

a. The formula of Type II pulsars is a typical one with magnetic decay. The observational distribution of Type II pulsars shows this decay obviously, but the time scales of the field decay are dependent on the initial strengths of the surface field. From the observational distribution we can find out the upper and lower limits for the initial magnetic field strengths and the corresponding time scales. They are $B_{o1} = 6.6 \times 10^{12}$ Gauss, $\tau_{D1} = 1.6 \times 10^{6}$ yr, and $B_{o2} = 9.4 \times 10^{11}$ Gauss, $\tau_{D2} = 2.3 \times 10^{7}$ yr, respectively.

b. The relations between the ages and periods of these two types of pulsars are quite different from each other. Type II pulsars have a limit on their periods caused by the field decay, but the Type I pulsars have a limit on their life. When the period of a type I pulsar approaches to 2-3 seconds, the period of it increases faster and faster and the pulsar is going to stop rotating soon. Thus, there should be a clear boundary round 2-3 seconds in the period distribution of Type I pulsars. This consequence is conincident with the observational distribution of Type I pulsars.

c. The Type I pulsars have their special evolutionary tracks on the $\lg(\dot{P}/P)$ -$\lg(P)$ diagram. All these tracks reach some minimal values of $\dot{P}/P$ at about P = 1 second. $\dot{P}/P$ is the relative energy loss rate of pulsars. So, this minimum may imply that the pulsars radiate the least energy at about P = 1 second and will be fainter and harder to be observed. This feature may cause the appearance of the gap in the observational distribution on Type I pulsars round P = 1 second. Besides, this character may also suggest that the luminosities of Type I pulsars will increase with their periods if P > 1 second.

D. J. Helfand and J.-H. Huang (eds.), The Origin and Evolution of Neutron Stars, 51.