Precession of inner core and free nutation of outer core of pulsar PSR B1828-11

I. Kitiashvili, A. Gusev

Kazan State University (Irina.Kitiashvili@ksu.ru / +7-843-2645604)

Observation of pulsars is a powerful source of the information for research of dynamics and internal structure of neutron stars. Analysis of the time-of-arrival pulses fluctuations can be reflection of thin effects of neutron stars rotational dynamics. The long-periodic precession phenomenon was detected for pulsars: PSR 2217+47, PSR 0531+21, PSR B0833-45, PSR B1828-11, PSR B1642-03 with period from 25 to 6136 days. PSR B1828-11 has long-term, highly periodic and correlated variations pulse shape and of the rate of slow-down with period variations approximately 1000, 500, 250 and 167 days. We explane for all harmonics of pulses variations as precession of a neutron star owing to differential rotation of crust, outer liquid core and inner crystal core of the pulsar. We use the Hamiltonian canonical method of Getino for the dynamically symmetrical three-layer model of the pulsar PSR B1828-11. We investigated dependence flateness of crust, outer and inner cores of pulsar from periods: Chandler wobble, Inner Chandler Wobble, Free Core Nutation and Free Inner Core Nutation from ellipticity of inner crystal core, outer liquid core and total pulsar. We have estimates the flateness of crust and outer core are $\sim 1.8 * 10^{-11}$ and flateness of inner core is $\sim 1.5 * 10^{-8}$.