

Abstract

In this dissertation I investigate a model of evolution of solitary pulsars in the Milky Way. I evolve spin period, its derivative, and magnetic field using the model of magnetic dipole in vacuum and exponential magnetic field decay. I consider two parametrizations for the phenomenological radio-luminosity law and include the selection effects for detecting a pulsar in the radio wavelength. I optimize the models parameters by using the Markov chain Monte Carlo method. To differentiate and power the optimization I compute the Likelihood statistic. I use the Parkes Multibeam Survey as a source of observed pulsars.

Based on the best fit parameters I draw conclusion about some aspects of neutron star evolution. I extrapolate the models in order to predict the number of observed pulsars in the future Square Kilometre Array observatory as well as to estimate the detection probability in gravitational wave observatories Advanced LIGO and Advanced Virgo.