

Estimating neutron star crust-core lag evolution using a hidden Markov model

Pulsar glitches are generally believed to be the result of a transfer of angular momentum from the superfluid core to the crust of the star. Previous work has treated the lag in the angular velocity between the core and crust as a mean-field, state-dependent Poisson process in order to model long term behavior of pulsar glitches. This angular velocity lag is not directly observable, but understanding its evolution could lead to new insights into neutron star physics and have potential implications in searches for gravitational waves from rotating neutron stars. Here we implement Hidden Markov Model (HMM) tracking to estimate the crust-core angular velocity lag based on the observed sizes and waiting times of pulsar glitches.