

PHAROS Conference 2020: The multi-messenger physics and astrophysics of neutron stars



Contribution ID: 165

Type: Oral Presentation

Population Synthesis of Young and Millisecond Pulsars from the Galactic Disk

Thursday 2 April 2020 11:30 (15 minutes)

Recent advances in realistic descriptions of pulsar magnetosphere with regions of finite conductivity allow for the predictions of the gamma-ray intensity over the observer sky in the form of a sky map. Such models incorporate trends of conductivity σ with spin-down power \dot{E} , cut-off energies ϵ_{cut} with \dot{E} , and the gamma-ray luminosity L_γ with ϵ_{cut} , magnetic field B , and \dot{E} , thereby eliminating model free parameters. On the other hand, the radio luminosity L_ν requires three model free parameters the overall multiplicative factor f_ν and the exponents of the period P and period derivative \dot{P} with α_ν and β_ν , respectively. We perform Markov Chain Monte Carlo simulations to search the parameter space in order to establish the most likely values of the model free parameters in the case of millisecond pulsars (MSP). We then perform a simulation of young pulsars (YP) assuming magnetic field decay. We present preliminary results of both MSPs and YPs from the Galactic Disk.

We express our gratitude for the generous support of the National Science Foundation under grant AST-1616632 and the Michigan Space Grant Consortium under grant NNX15AJ20H.

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Session Classification: Parallel 1B

Track Classification: Observations and Surveys