Abstract Submitted
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Improvement in applying observations to understanding glitches in pulsars[1] SABRINA BERGER, Diablo Valley College, WILLIAM NEWTON[2], Texas A and M University-Commerce — Some pulsars exhibit glitches - sudden decreases in period every few years - that may arise from the interactions between the neutron star crust and core. By comparing the predictions of theoretical models to empirical data of glitches, we hope to resolve the details of the glitch mechanism and constrain the underlying nuclear matter equation of state (EOS). The basic glitch paradigm supposes some part of the crust does not spin down with the rest of the star until a critical lag between the frequency of that part of the crust and the core is reached, at which point angular momentum is transferred from crust to core, spinning the star up. We focus on model predictions of how strongly the crust couples to the core: this determines how much of the core gets spun up and can be tested by data from the Vela pulsar. The crust and core couple via mutual friction, in which electrons scatter off of magnetized superfluid neutron vortices in the core. We generate many EOSs spanning the current range of uncertainty in the nuclear symmetry energy and consistently calculate the strength of mutual friction throughout the core of the neutron star for each EOS. We find that, considering the most conservative range of EOSs, the crust cannot provide a large enough angular momentum reservoir to explain the Vela data, and that the crust-core coupling model therefore has to be revised.

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