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Pulsar Glitches and the Neutron-Star Matter Equation of State FARRUKH J. FATTOYEV, Indiana University, JORGE PIEKAREWICZ, Florida State University, CHARLES J. HOROWITZ, Indiana University — Long time observation of sudden spin jumps in the Vela pulsar suggests that at least 1.6% of the total moment of inertia must reside in the solid crust. It has been argued that the amount of superfluid entrainment in the crust effectively reduces the angular-momentum reservoir, and in turn suggests that the crustal fraction of the moment of inertia must increase to about 7%. This indicates that the required angular momentum reservoir may exceed the one available in the crust as predicted by most models of the equation of state. We explore the possibility that uncertainties in the equation of state provide enough flexibility for the construction of models that predict a large crustal moment of inertia. Since the crustal moment of inertia is sensitive to the transition pressure at the crust-core interface, we tune the parameters of the model to maximize the transition pressure, while still providing an excellent description of nuclear observables. In particular, we find that if the neutron-skin thickness of 208Pb falls within the (0.20-0.26) fm range, large enough transition pressures can be generated to explain the large Vela glitches without invoking an additional angular-momentum reservoir beyond that confined to the solid crust. Our results suggest that the crust may be enough.

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