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Braking Index of Isolated Pulsars OLIVER HAMIL, JIRINA STONE, Univ of Tennessee, Knoxville, MARTIN URBANEC, GABRIELA URBANCOVA, Silesian University in Opava, Opava, Czech Republic — Isolated pulsars are rotating neutron stars with accurately measured angular velocities Ω, and their time derivatives which show unambiguously that the pulsars are slowing down. The exact mechanism of the spin-down is a question of debate in detail, but the commonly accepted view is that it arises through emission of magnetic dipole radiation (MDR). The energy loss by a rotating pulsar is proportional to a model dependent power of Ω. This relation leads to the power law $\dot{\Omega}$ = -K Ω^{n} where n is called the braking index, equal to the ratio $(\Omega\ddot{\Omega})/\ \dot{\Omega}^2$. The simple MDR model predicts the value of n = 3, but observations of isolated pulsars provide rather precise values of n, individually accurate to a few percent or better, in the range 1< n < 2.8, which is consistently less than the predictions of the MDR model. In this work, we study the dynamical limits of the MDR model as a function of angular velocity. The effects of variation in the rest mass, the moment of inertia, and the dependence on a realistic Equation of State of the rotating star are considered. Furthermore, we introduce a simulated superfluid effect by which the angular momentum of the core is eliminated from the calculation.

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