

The Structure and Signals of Neutron Stars, from Birth to Death



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Superfluid magneto-elastic oscillations in Magnetars

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Our numerical simulations show that axisymmetric, torsional, magnetoelastic oscillations of magnetars with a superfluid core can explain the whole range of observed quasiperiodic oscillations (QPOs) in the giant flares of soft gamma-ray repeaters. There exist constant phase QPOs at $f \approx 150$ Hz and resonantly excited high-frequency QPOs ($f > 500$ Hz), in good agreement with observations. The range of magnetic field strengths required to match the observed QPO frequencies agrees with that from spin-down estimates. These results suggest that there is at least one superfluid species in magnetar cores.

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