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Diffusion as the main source of dissipation in superconducting neutron stars

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We show that the diffusion of various particle species in superconducting neutron star cores can be extremely powerful dissipative mechanism. In particular, it can be much more efficient than the shear and bulk viscosities. This result has important implications for the damping times of NS oscillations, development and saturation of dynamical instabilities in NSs, and for the excitation and coupling of oscillation modes during the late inspiral of binary NSs.

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