

Abstract Submitted
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Disordered nuclear pasta, magnetic field decay, and crust cooling in neutron stars¹ C.J. HOROWITZ, D.K. BERRY, C.M. BRIGGS, M.E. CAPLAN, Indiana Univ - Bloomington, A. CUMMING, McGill Univ., A.S. SCHNEIDER, Caltech — Nuclear pasta, with non-spherical shapes, is expected near the base of the crust in neutron stars. Large scale molecular dynamics simulations of pasta show long lived topological defects that could increase electron scattering and reduce both the thermal and electrical conductivities. We model a possible low conductivity pasta layer by increasing an impurity parameter Q_{imp} . Predictions of light curves for the low mass X-ray binary MXB 1659-29, assuming a large Q_{imp} , find continued late time cooling that is consistent with Chandra observations. The electrical and thermal conductivities are likely related. Therefore observations of late time crust cooling can provide insight on the electrical conductivity and the possible decay of neutron star magnetic fields (assuming these are supported by currents in the crust).

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