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High Amplitude Bulk Viscosity of Dense Matter and Probing the Phases of Dense matter with Neutron Star Physics SIMIN MAHMOODIFAR, MARK ALFORD, KAI SCHWENZER, Washington University in St. Louis — Neutron stars are the only laboratory for studying cold ultra-dense matter. Since the density at the core of a neutron star is extremely high one could expect the existence of exotic matter such as degenerate quarks, boson condensate and etc in the core. Studying the transport properties of the different phases of dense matter that can occur in a compact star is important because transport properties such as viscosity, emissivity, heat capacity and etc, in addition to depending on the equation of state of matter, also depend on the low-energy degrees of freedom and therefore can discriminate between different phases more efficiently. In this talk I will present our results for the high amplitude bulk viscosity of dense matter and I will explain how spin-down evolution of neutron stars can be used as a probe of the phases of matter at low temperatures and high densities.

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