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Phase conversion dissipation in multi-component compact stars SOPHIA HAN, MARK ALFORD, KAI SCHWENZER, Washington University in St. Louis — We propose a mechanism for the damping of density oscillations in multi-component compact stars. The mechanism is the periodic conversion between different phases, i.e. the movement of the interface between them, induced by pressure oscillations in the star. The damping grows nonlinearly with the amplitude of the oscillation. We study in detail the case of r-modes in a hybrid star with a sharp interface, and we find that the dissipation is vanishingly small at infinitesimal amplitude, but becomes very strong as the amplitude increases. This strong dissipation saturates unstable r-modes in compact stars with a sufficiently large core at amplitudes that are orders of magnitude below those provided by any other known saturation mechanism, and therefore this mechanism is likely to be the dominant one in hybrid stars with a sharp interface. We give a simple analytic prediction for the saturation amplitude, and find that it can be as low as of order 10^{-10} for conditions present in observed pulsars.

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