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Dissipation in multi-component compact stars SOPHIA HAN, MARK ALFORD, KAI SCHWENZER, Washington University in St. Louis — We proposed a novel mechanism for the saturation of unstable oscillation modes in multi-component compact stars, which is based on the periodic conversion between different phases, i.e. the movement of their interfaces, induced by pressure oscillation in the star. The case of r-modes in a hybrid star with a sharp interface between a quark matter core and a nuclear matter crust is studied in detail and we find that this mechanism can lead to low saturation amplitudes, and thereby it could present the dominant damping mechanism in hybrid stars. We study the dissipation due to hadron-quark burning in a hybrid star using a steady-state approximation and find that in this case the dissipation entirely vanishes in the subthermal regime, but becomes finite and very strong once the oscillation amplitude reaches a critical value. This strong dissipation saturates unstable r-modes just above the critical value and as a result leads to a simple analytic prediction for the saturation amplitude. We find that the r-mode saturation amplitude can be as low as about 10^{-4} for conditions present in typical observed pulsars.

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