April APS 2022 Abstract

A Comparison of the SASI under Newtonian and General Relativistic Conditions

(1,300 characters max, currently at 1,243 characters)

After the collapse of a massive star, the newly formed shock stalls within the iron core. A contributing factor to the re-invigoration of the shock is a purely hydrodynamical instability known as the standing accretion shock instability (SASI). The SASI has been extensively studied in the context of Newtonian gravity and hydrodynamics (see, e.g., Blondin et al., 2003, ApJ, **584**, 971; Foglizzo et al., 2006, ApJ, **652**, 1436, Fernández 2015, MNRAS, **452**, 2071), and has also been explored under general relativistic conditions with tabulated equations of state (Kuroda et al., 2016, ApJL, **829**, L14). However, the true nature of the SASI, i.e., as a purely hydrodynamical phenomenon, has not been thoroughly investigated with a general relativistic treatment. I will discuss the results of a suite of simulations from `thornado` (Endeve et al., 2019 J. Phys.: Conf. Ser. **1225** 012014), a high-order accurate radiation hydrodynamics code, comparing the SASI under conditions ranging from post-Newtonian well into general relativistic regimes. By varying the mass of the proto-neutron star, the initial shock radius, and the mass accretion rate, I explore the impact that a general relativistic treatment has on the dynamics and evolution of the SASI.