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Non-convex fluid dynamics in neutron stars

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Non-convex flows, or Bethe-Zeldovich-Thompson flows, can develop composite waves such as rarefaction shocks. This type of non-classical dynamics can be easily characterized by the so-called fundamental derivative, a quantity describing the convexity (wave structure) of a physical system and related to its equation of state. Non-convex dynamics has been analyzed for Newtonian flows and, more recently, for relativistic flows. We discuss here the effects non-convex flows may have on the dynamics of neutron stars, in the context of gravitational collapse and mergers.

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