

Negative masses are unstable

and we don't need energy
conditions to prove it

We studied **negative-mass**, spherically symmetric **stars** made of ideal barotropic fluids. After considering linear perturbations away from staticity, we learned that all such models **are unstable**. Thus, we found a completely classical explanation for the absence of negative masses. While all previous positive mass theorems assume microscopic positivity of mass in some sense, ours does not.

Níckolas de Aguiar Alves, A. G. S. Landulfo, and B. A. Costa. "Positive Mass in General Relativity Without Energy Conditions," 2024. arXiv: 2408.00154 [gr-qc].

