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3D general relativistic collapse of rotating neutron stars into black holes

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In this work, we investigate the phenomenon of neutron star collapse into a black hole within the framework of modified theories of gravity, exploring the consequences of departures from General Relativity (GR), specifically, under massive scalar-tensor theories that allow for scalarization in order to understand the effect of these modifications in the astrophysical process. To accomplish this, we employ advanced numerical techniques and high-performance computing to accurately model the dynamics of the star's core as it approaches the critical density for collapse and the posterior stage when the black hole is formed. We will also compute the gravitational radiation and compare our findings with observational data to constrain the parameters of these alternative gravity theories.

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