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Core collapse in scalar-tensor theory with massive fields

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Though General Relativity has been successfully tested so far, concepts such as dark energy and string theory suggest the need of modifying it. Scalar-tensor theory is one of the most popular alternatives discussed. The key motivation for looking at the ones with massive fields is that they are far less constrained by binary pulsar observations, in contrast to the massless case. In this talk, I will demonstrate studies in stellar core collapse in spherical symmetry that were performed by adapting the numerical code GRID to the case of massive scalar-tensor gravity. The addition of a mass term allows, within present constraints, much stronger gravitational wave emission than in the massless case, while the dispersion in the propagation of the scalar leads to a quasi-monochromatic signal, potentially detectable by LIGO /Virgo with existing analysis pipelines.

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