



Binary Proca stars: dynamics and gravitational wave emission from eccentric mergers

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Boson stars are theoretical exotic compact objects which are considered as a possible explanation of dark matter. In this talk, I will discuss the dynamics and gravitational wave (GW) emission of binary rotating vector boson stars (known as Proca stars) mergers in eccentric orbits. We have investigated configurations with different masses and compactness, varying the parameters of the binary (initial velocity and phase difference), and finding how these parameters can affect the outcome of the mergers and the gravitational waveforms. In particular, the initial relative phase of the two complex vector fields forming the stars can drive the merger in a plethora of different outcomes, affecting the GW energy emitted and its mode structure. Furthermore, I will also review these peculiar dynamics: from the formation of transient short-living hypermassive Proca stars to the formation of a Kerr black hole with a faint Proca field remnant around the horizon.

- **Presenter:** Gabriele Palloni

- **Key words:** Binary Proca stars, gravitational waves, numerical relativity, general relativity