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Searching for Spin-2 Ultralight Dark Matter with Gravitational Wave Detectors

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We explore how gravitational wave detectors, such as LIGO and Virgo, can be leveraged to search for spin-2 ultralight dark matter. These particles are expected to produce a continuous signal, making them well-suited for search methods originally developed for continuous gravitational waves. In this context, we develop a search using the Band Sampled Data framework (a gravitational wave data analysis tool), where we inject the spin-2 signal for a range of masses and coupling constants. We will present the corresponding sensitivities and discuss the potential of these searches in constraining ultralight dark matter.

Authors: C. M. DELGADO, Paola (CEICO - FZU - The Czech Academy of Sciences); PICCINNI, Ornella Juliana; URBAN, Federico (INFN)

Presenter: C. M. DELGADO, Paola (CEICO - FZU - The Czech Academy of Sciences)

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