

Using gravitational waves to look for dark matter (in)directly

Gravitational wave detectors offer promising probes to search for dark matter, both directly and indirectly. If dark matter originates from a background of ultralight gauge bosons, these bosons could exert forces on the test masses of gravitational wave detectors, inducing displacements with characteristic frequencies determined by the boson mass. On the indirect side, the Fermi satellite has observed an excess of GeV gamma rays from the Galactic Center. The origin of this excess remains under debate, with leading hypotheses including dark matter annihilation or emission from a population of millisecond pulsars. The continuous gravitational wave searches conducted by the LVK collaboration have strong potential to help resolve this long-standing question.

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