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Direct limits for scalar field dark matter from a gravitational-wave detector

Thursday, 8 July 2021 18:00 (30 minutes)

We report on the first direct search for low-mass scalar field dark matter utilising a gravitational-wave detector. We set new upper limits for the coupling constants of scalar field dark matter as a function of its mass by excluding the presence of signals that would be produced through the direct coupling of this dark matter to the beamsplitter of the GEO600 interferometer. The new constraints improve upon bounds from previous direct searches by more than six orders of magnitude and are more stringent than limits obtained in tests of the equivalence principle by one order of magnitude.

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Session Classification: Variation of the Fundamental Constants, Tests of the Fundamental Symmetries and Probes of the Dark Sector

Track Classification: Precision Tests: Variation of the fundamental constants, tests of the fundamental symmetries and probes of the dark sector