

## Workshop on a wide field-of-view Southern Hemisphere TeV gamma ray observatory

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# Beyond the Standard Model with Wide-field Observatories

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Multi-TeV, wide field-of-view (fov) gamma-ray observatories are uniquely suited to search for beyond-the-Standard-Model (BSM) physics using astrophysical objects. These include searches for dark matter, primordial black holes, axions, and tests of Lorentz invariance. Some of the most promising dark matter sources in the sky are several degrees across, so searches with smaller fov instruments are difficult. Also, stacked analyses of many dark matter sources can be used to improve an experiment's dark matter sensitivity, and large field of view instruments survey several dark matter targets. The signatures of primordial black holes could appear anywhere on the sky without warning, so large fov searches are needed to be able to find them. Lorentz invariance violation can best be probed by prompt observations of gamma-ray bursts and long-time studies of pulsars, both of which require long-uptime, large fov studies. Axion-like-particle searches can be done through high-energy observations of distant sources, which requires a large selection of objects to study. Wide fov instruments can search for evidence of several novel physical processes, from quantum gravity to supersymmetry to the nature of dark matter.

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