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(G*) Signatures of Primordial Black Holes in theories of Large Extra Dimensions

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Additional spatial dimensions compactified to submillimeter scales serves as an elegant solution to the hierarchy problem. As a consequence of the extra-dimensional theory, primordial black holes can be created by high-energy particle interactions in the early universe. While four-dimensional primordial black holes have been extensively studied, they have received little attention in the context of extra-dimensions. We adapt and extend previous analyses of four-dimensional primordial black holes for the purpose of studying the impact extra-dimensions have on cosmology. We find new constraints on both extra-dimensional primordial black holes, and the fundamental extra-dimensional theories by combining an analysis of Big Bang Nucleosynthesis, the Cosmic Microwave Background, the Cosmic X-ray Background, and the galactic centre gamma-rays. With these constraints we explore to what extent these extra-dimensional primordial black holes can comprise the dark matter in our universe.

Primary authors: VINCENT, Aaron (Queen's University); FRIEDLANDER, Avi (Queen's University); MACK, Katherine (North Carolina State University); SONG, Ningqiang (Queen's University); Dr SCHON, Sarah (Queen's University)

Presenter: FRIEDLANDER, Avi (Queen's University)

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