



Contribution ID: 89

Type: **not specified**

Rubin Observatory as a Flagship Dark Matter Experiment

Although dark matter plays a lead role in driving the expansion of the universe and the growth of structure, its fundamental nature remains a mystery to humans. In the absence of a definitive detection of it in a laboratory setting, the theoretical landscape of plausible particle dark matter candidates has grown broader and more diverse in the past decade since the last Snowmass process. Even as the laboratory searches to discover these candidates also diversify, the study of the fundamental particle properties of dark matter in its native context, the cosmos, is becoming a precision science. I will outline how dark matter astrophysics has become a precision science, and advocate for the idea that we should be thinking of telescopes as dark matter experiments. While I will focus on the Rubin Observatory, I will emphasize that this framing and approach suits a broad range of future projects.

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Session Classification: Open Session for Remarks and Discussions