SES21-2021-000161

Abstract for an Invited Paper
for the SES21 Meeting of
the American Physical Society

Hunting Planet Formation in the Act: Theory, Observation, and Machine Learning

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Over the last few decades, astronomers discovered more than 4,000 exoplanets orbiting around stars other than the Sun. The discovery suggests that planet formation is ubiquitous in our galaxy. However, exoplanets exhibit great diversity, raising challenging questions about planet formation processes. One of the best ways to learn about planet formation processes is to observe planets while they are forming. The task of observing young, forming planets has long been very challenging, but it has finally become possible with increasingly powerful observing facilities and techniques. In this talk, I will review recent high-resolution observations of protoplanetary disks − the birthplaces of planets − and introduce how these state-of-the-art observations, along with theories, numerical simulations, and machine learning, can help us better understand planet formation processes and planet-forming environments.