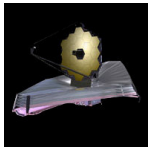

3701 - Searching for ultra-faint trans-Neptunian objects in archival NIRCam calibration data

Cycle: 2, Proposal Category: AR

INVESTIGATORS

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OBSERVATIONS

ABSTRACT

Small objects in the outer Solar System are the most primitive relics of the formation of our Solar System. These small bodies have undergone minimal change over the last 4 billion years and record that era in their chemical and dynamical properties. The residents of this region are often referred to as trans-Neptunian objects, and they are quite difficult to study, as they are distant, have low reflectivities, and are very faint.

We propose to measure the size distribution of trans-Neptunian objects as small as 10 km by analyzing hundreds of archival NIRCam calibration datasets. We will detect around 200 objects smaller than 50 km diameter — the largest ever survey of very faint objects in the outer Solar System — with the smallest objects having diameters around 5 km. We will also constrain the mean color of the faint trans-Neptunian population and compare the size distributions between dynamically cold and hot populations. All of the necessary data will be in the public archive by June 30, 2023.

OBSERVING DESCRIPTION

This is an archival proposal to search Cycle 1 NIRCam calibration data for faint TNOs. We will use digital tracking methods to find TNOs as faint as equivalent V magnitudes of around 30, corresponding to TNOs with diameters 10 km or smaller. This is a computationally intensive project, but one that is now standard practice in the field.

There are no new observations obtained in this project. All data is, or will be, public before the start of JWST Cycle 2.