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Multi-Wavelength Identification of Extremely Young Galaxies with CANDELS

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Understanding the formation and evolution of young galaxies in the early universe is a pivotal goal in cosmology. These galaxies reveal clues on how large galaxies, like our own Milky Way, were formed and evolved. In this project, we use data from the Cosmic Assembly Near-infrared Deep Extragalactic Legacy Survey (CANDELS) to study the physical properties of distant extremely young galaxies. CANDELS, one of the largest programs of the Hubble Space Telescope, imaged over 250,000 distant galaxies in multiple wavelengths in optical and near-infrared. To search for extremely young galaxies from this huge dataset, we use a criterion to select galaxies whose brightness in a certain near-infrared bandpass is dramatically boosted by the emission from the interstellar medium in star-forming regions. After reducing noise and uncertainties in our sample, we select 311 candidates. Their stellar masses range around 10-100 million times the mass of our sun, making them 1001000 times smaller than our Milky Way. We also investigate other physical properties of these candidates (i.e. number density, mass, star formation rate, shape, etc). These candidates are analogs of the progenitors of Milky Way type galaxies. Understanding them will provide clues of the physics that drives galaxy formation and evolution.