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Searching for the Missing Puzzle Pieces of the Early Universe with JWST in the COSMOS Field —3μm Dropout Galaxies

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The quest to comprehend the origin and evolution of the cosmos stands as one of the most profound enigmas in the realm of science. It encompasses the birth of fundamental elements, the intricate process of star and galaxy formation, and the dawn of the first galaxies in our ever-expanding universe. At the heart of this quest lies the imperative task of identifying the most remote galaxies, whose study yields critical insights into the primitive conditions of the universe during the Epoch of Reionization.

One of the instrumental endeavors in this cosmic exploration is the Cosmic Evolution Survey (COSMOS) project, which includes the "Search of 3μm Dropouts in JWST COSMOS field." Under the broader COSMOS initiative, the COSMOS-Web project embarks on a contiguous 0.54 deg^2 NIRCam imaging survey employing multiple filters, thus pushing the boundaries of observational depth. The primary objective of this endeavor is to identify dropout sources from JWST data, with a specific focus on Lyman break galaxies. I analyzed COSMOS data, using crude selection to find z~7.88 galaxy candidates.

Lyman break galaxies are of particular interest due to their distinctive "Lyman break" phenomenon. This effect arises from the shift of the Lyman limit into observable wavelengths, a consequence of the cosmic expansion. The resulting shift enables telescopes to capture this characteristic spectral feature in various wavelength bands, leading to the identification of "dropouts" in specific spectral regions, such as "H-dropouts" within the near-infrared range. These dropout galaxies provide a unique window into the early universe, offering valuable insights into its most distant realms.

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