

## Constraining galaxy close pair fractions and merger rates from Cosmic Noon to Cosmic Dawn using deep JWST observations

Galaxy mergers play a crucial role in the mass build-up and evolution of galaxies according to hierarchical structure formation and cosmological simulations. I will present the most extensive study of major galaxy mergers (with a stellar mass ratio of 1:4) to date, covering the yet poorly understood and mainly unexplored redshift range of  $z \sim 2-10$ . I use the NIRCam imaging and NIRSpec spectroscopic datasets from the JADES GTO programme, which is the most extensive JWST programme. I focus on measuring the close pair fraction using a probabilistic method incorporating the full posterior distribution and uncertainties related to the parameters obtained from photometric redshift and SED fitting. Galaxies are carefully selected only to include the highest quality photometric redshift posteriors to form a mass-complete sample and account for potentially missing objects due to selection effects and incompleteness in the form of different statistical weights. The selection criteria for finding close pairs include stellar mass ratio for major mergers, projected 2D separation proximity, and substantial overlap between the photometric redshift posterior distributions. I also correct for potential objects missing due to survey boundaries limiting the search area and assess the effects of cosmic variance. Pair fractions are then evaluated in different stellar mass bins at a wide range of cosmic epochs, with uncertainties obtained by bootstrapping analysis. The close pair fractions are turned into galaxy merger rates by assuming a characteristic merger timescale obtained from cosmological simulations. The pair fractions found show an increasing trend with redshift at lower stellar masses and a constant or slightly declining trend at the higher stellar mass bins. The resulting merger rate still agrees with simulations showing an increase as the dynamical timescale gets shorter at higher redshifts.