

# Earliest Ionised Bubbles

Age and location of spectroscopically-confirmed distant, early galaxies suggesting the presence of early ionised bubbles. Young and low-mass galaxies (on the order of 200–600 Million years old and  $10^8$ – $10^{10}$  solar masses) have the highest star formation rates and are typically Lyman-alpha emitters. The presence of numerous Lyman-alpha emitting galaxies in this field (illustrated as light stars), including several with high equivalent widths ( $> 200 \text{ \AA}$ ) and Lyman-alpha escape fractions ( $> \sim 50 \%$ ), provides strong evidence for candidate ionised bubbles along the line of sight (shaded regions – for illustration purposes only). These early observations (primarily of  $M_{UV} < -19$  Hubble Space Telescope-selected sources) highlight the potential of the James Webb Space Telescope, *JWST*, to create tomographic maps of ionised regions to learn about the re-ionisation process on local scales. The observations displayed are in the *CEERS* EGS field at redshifts between 7.1–7.8 and reproduced from Chen et al. (2024).

This graphic was developed during the breakthrough workshop 'The Chronology of the Very Early Universe According to JWST: The First Billion Years' at the International Space Science Institute (ISSI) in Bern, Switzerland.

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