

Investigating the acceleration of galaxy growth in a $z = 3$ protocluster

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Abstract

One route to accelerated galaxy growth in the very densest environments in the Universe at early epochs (protoclusters) is via an earlier onset / higher frequency of major mergers which trigger star formation and black hole growth compared to galaxies in the average density field. If this is the case, one would expect the relative fraction of normal galaxies exhibiting on-going merger and tidal interactions in protocluster regions to be different to that of an identically (mass) selected field population. We have examined the rest-frame UV morphologies of Lyman-break Galaxies (LBGs) in the SSA22 protocluster at $z = 3.1$ compared to LBGs at $z \sim 3$ in the HDF-N. Our results indicate that the merger fraction for the protocluster is significantly larger than that for the field suggesting that dense environments may indeed have higher merger fractions than the field at $z \sim 3$.