Astrophysics > Cosmology and Extragalactic Astrophysics

Predicting the Merger Fraction of Lyman alpha Emitters from Redshift z~3 to z~7

Vithal Tilvi, Evan Scannapieco, Sangeeta Malhotra, James E. Rhoads
(School of Earth & Space Exploration, Arizona State University)

(Submitted on 13 Jul 2011 (v1), last revised 21 Oct 2011 (this version, v2))

Rapid mass assembly, likely from mergers or smooth accretion, has been predicted to play a vital role in star-formation in high-redshift Lyman-alpha (Lya) emitters. Here we predict the major merger, minor merger, and smooth accreting Lya emitter fraction from z~3 to z~7 using a large dark matter simulation, and a simple physical model that is successful in reproducing many observations over this large redshift range. The central tenet of this model, different from many of the earlier models, is that the star-formation in Lya emitters is proportional to the mass accretion rate rather than the total halo mass. We find that at z~3, nearly 35% of the Lya emitters accrete their mass through major (3:1) mergers, and this fraction increases to about 50% at z~7. This imply that the star-formation in a large fraction of high-redshift Lya emitters is driven by mergers. While there is discrepancy between the model predictions and observed merger fractions, some of this difference (~15%) can be attributed to the mass-ratio used to define a merger in the simulation. We predict that future, deeper observations which use a 3:1 definition of major mergers will find >30% major merger fraction of Lya emitters at redshifts >3.

Comments: Accepted in MNRAS
Subjects: **Cosmology and Extragalactic Astrophysics (astro-ph.CO)**
Cite as: **arXiv:1107.2648v2 [astro-ph.CO]**

Submission history

From: Vithal Tilvi [view email]
[v1] Wed, 13 Jul 2011 20:00:00 GMT (329kb)
[v2] Fri, 21 Oct 2011 15:33:18 GMT (83kb)

Which authors of this paper are endorsers?