GALAXY FORMATION STUDY USING QSO ABSORBERS

Arati Chokshi
IPAC/Caltech
770 So. Wilson Ave.
Pasadena, CA 91125
U.S.A.

ABSTRACT. Observations of QSO absorbers at Z $\sim$ 2 suggest that they represent a population of primeval, dynamically evolving systems which turn into the local galaxy population.

We analyze the published QSO absorption line data for Lyman α forest lines, metal line absorbers, and damped Lyman α systems in terms of their total hydrogen content (N_H) and the velocity dispersion (σ_v). Lyman α forest absorbers form a contiguous sequence with metallic absorbers on this diagram. Thus, it is conceivable that the former represent low column density, low mass end of the larger metallic systems. For majority of the absorption systems, cooling appears to have played an important role on dynamical time scales at the epoch of observation, although most systems have not evolved sufficiently to resemble the local galaxy population. Thus they represent a population of primeval, dynamically evolving systems. We interpret the observations of large velocity dispersion in metal line systems as indicative of large scale star-formation process occurring in forming galaxies - possibly associated with the epoch when globulars made most of their stars. Their location on the cooling diagram indicates that, for most absorbers, large velocity dispersions cannot be attributed to galaxy-galaxy correlations. Of the two extreme cosmological scenarios, the data are more easily interpretable for a dark matter dominated universe than for a purely baryonic universe. For a dark to baryonic matter ratio of 10, observations suggest that the ultimate fate of all QSO absorbers is to evolve into the local galaxy population.

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