THE STATISTIC STUDY OF Lα ABSORPTION LINES

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The statistic studies of the absorbing forest in the spectra of high redshift QSOs will provide an important approach to the understanding of the physical properties of the absorbing materials. For this purpose a collection of uniform samples would be very important and urgent. It is very time consuming of the large telescopes to take the high resolution, high ratio-to-noise and wide coverage of wavelength of the QSO's spectra, therefore, an international collaboration in a uniform way would be very desirable.

We added here 4 spectra of high redshift QSOs, namely PKS 0528-250, PKS 0805+046 (4C 05.34), PKS 1448-232 and PKS 1442+101 (0Q 172), to SYBT's sample (Sargent, Young, Boksenberg and Tytler, 1980 (Ap. J. Suppl. 42, 81), all of which were taken at RGO spectrograph and IPCS attached to the Cassegrain focus of 3.9^m AAT with 1200/m grating and 25cm camera resulting in 1-2 Å resolution, so can be matched to the SYBT's sample. This larger sample nearly doubles the number of SYBT's and extends the upper limit of the redshift to 3.543 (0Q 172). Since the strong correlation between Lα and Lß, we have asked the Lα sample satisfying the condition: $1025.72(1+Zem) \leqslant \lambda \leqslant 1215.67(1+Zem)$. This makes a slight modification for SYBT in taking off the lines outside this window and leaves altogether 350 lines for 9 QSOs. A series statistical test, which is similar to that of SYBT, leads to the conclusion that: 1) There is no significant difference in the number density of Lα lines among these 9 QSOs; 2) There is no significant variation in line density with redshift. The number variation is consistent with the Friedman cosmological models (with $0 \leqslant q_o \leqslant 1$); 3) The rest equivalent width spectrum shows no significant variation with redshift; 4) There is no difference in the properties of Lα absorption lines in the wing of the Lα emission and those in the continuum. This means the size of the clouds D^c 10^{20} cm; 5) The two-point correlation function of the Lα clouds is flat, unlike that of galaxies. In summary, the results strengthen the point of view: the Lα clouds are probably intergalactic clouds.

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