CLUSTERING OF GALAXIES FROM STATISTICAL STUDIES OF QSO ABSORPTION SPECTRA

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It is well known that there are a lot of unidentified absorption lines in the spectra of QSOs. The usual method of identification of these lines based on the standard list of the most strong lines typical for interstellar medium and the corona of our Galaxy has some serious failures and never will lead to the absolute success.

Therefore we propose to apply together with this usual method the method of autocorrelation functions employed by some authors before. We have described this method in our paper [1].

One of the most interesting result of our analysis of 37 QSO spectra with $Ze \geqslant 2$ is that there are real maxima in the ACF on the position of the ratio of CIV doublet lines for more than 50% of studied spectra [2].

To understand the nature of the maxima we have chosen nine QSOs with the most pronounced CIV peaks in ACF (see fig. 1).

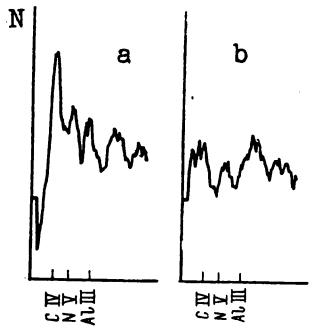

Figure 1. The ACF averaged from nine individual functions: a) real spectra; b) simulated spectra.

F. Combes and F. Casoli (eds.), Dynamics of Galaxies and Their Molecular Cloud Distributions, 413–415.

We suppose that there are three possible reasons of the appearance of the large number of CIV doublets in QSO spectra:
1) high ionized clouds ejected from QSOs with Za close to Ze;
2) line-locking effects in CIV doublet lines;
3) abnormal number of CIV clouds in the intergalactic medium or in the intervening galaxies.

In our sample of nine QSOs there are all three types of CIV doublets and when we have canceled those which were connected with the first two effects we get 53 doublets formed in the intergalactic medium and not connected physically with QSOs. By analogy with term "Ly-α forest" lines we offer to call these lines as belonging to the "CIV-bush" lines.

For these 53 "CIV-bush" doublets we have calculated the two-point correlation function. We have used the method described in [3].

There are the massive peak in the two-point correlation function for the CIV doublets corresponding to scales of ~500 km s^{-1} and quasi-periodical structure (see fig.2) with scale ~4000 km s^{-1} [4].

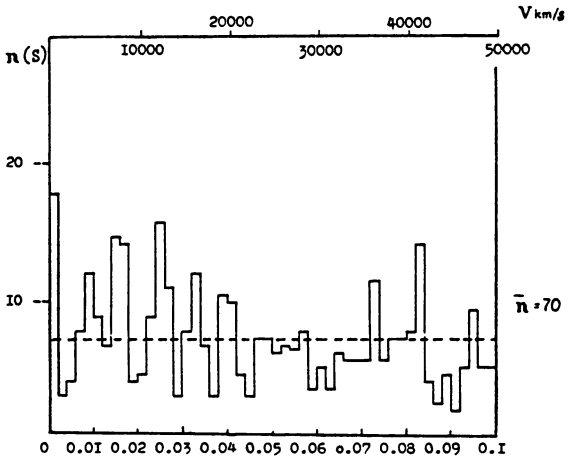

Figure 2. The two-point correlation function for "CIV-bush" doublet lines.

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Quasi-periodical form of two-point correlation function may be the result of cell-structure in the distribution of CIV absorbing regions. Such structure was discovered, for example in [5] for galaxy distribution in the Coma cluster with the scale ~ 5000 km s^{-1} - very close to our scale ~ 4000 km s^{-1}.

If "CIV-bush" doublet lines are connected with the intervening galaxies, the cell-structure in the galaxy distribution seems to be held up to the red shifts $Z \gtrsim 2.5$.

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