ON THE INTERPRETATION OF QSO ABSORPTION LINES

V. Müller, J. P. Mücket, S. Gottlöber, H. J. Haubold
Zentralinstitut für Astrophysik der AdW der DDR,
Potsdam, DDR - 1591

QSO absorption spectra may offer a clue to the distribution of intervening matter clouds at z = 0 ... 3. We tackle 1) the question of the occurrence of metal absorption lines of different ionisation levels in the same redshift systems by investigating the radiation transport through an inhomogeneous temperature profile; 2) the clustering properties of the lines of the Lyα forest by a correlation analysis of 9 published high-resolution QSO-spectra with the result of a certain contribution of metal absorption lines as well as marginally significant positive correlation regions $\xi \approx 0.3$.

1. Cooling Waves. The absorption lines are assumed to arise from gas condensations of comparable low temperature in the hot pancake gas with a cooling wave on the interface between the hot and cold phase (Doroshkevich and Zeldovich 1983). We consider the radiation transport through a temperature profile which results from T-dependent cooling rates and heat conductivity. To this aim we solve the nonlinear heat conductivity equation under isobaric conditions. For realistic parameters the extension of the cooling wave exceeds the diameter of the cloud leading to a) the excitation of different ionisation levels in a single redshift system, b) metal absorption systems without Lyα lines, c) realistic column densities and equivalent widths.

2. Correlation Analysis. The two-point autocorrelation function of supposed Lyα absorption lines in the spectra of 2 QSO pairs (Q0307-195A,B; Q1236+268,269) and 4 single QSOs (Q0122-380; Q1101-264; Q0420-388; Q2000-330) show some quasi-periodic structures of magnitude $|\xi| \approx$ 0.3 ... 0.5 . Isolated peaks at small comoving separations Δv_0 may be attributed to metal systems, in particular to the CIV doublet (1548-1550), the SiII doublet (1190-1193) and the separation SiIII(1206)-Lyα . There remains a characteristic period comparable to the spacing of superclusters of galaxies $\Delta v_0 = 3000$ km/s. The distribution of nearest neighbours allows for the interpretation that the absorption clouds lie in sheetlike structures as predicted by the pancake model.

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