Session 12: Absorption Lines in QSOs

Display Session
Grand Ballroom

12.01
Analysis of Far-UV High Excitation Line Emission Detected in the Gravitational Lens Q0957+561 with IUE-NEWSPINS


We have continued analysis of far-UV high excitation emission lines which were detected in the double lens quasar Q0957+561 during test runs of the New Spectral Image Processing System (NEWSPINS) of data obtained from the International Ultraviolet Explorer (IUE) archive (Michalitsianos et al., ApJ Lett., Nov. 10, 1993). The significant reduction of fixed-pattern background noise, and the use of a signal-weighted extraction slits, was applied to 10 co-added LWP (2000-3200Å) spectra, revealed the presence of emission lines of S VI 933,945Å, C III 978Å, N III 992Å, S IV 1063-1073, N II 1084Å, O VI 1031,1037Å and Fe III (UV1:1125Å), in addition to Ly-alpha 1215Å and N V 1240Å previously reported. These identifications assume rest wavelengths consistent with the z = 1.41 redshift of the lensed quasar. We also found strong Ly-beta 1020Å absorption at a redshift consistent with a previously reported damped Ly-alpha system at z = 1.3911, which is probably associated with an intervening gas near the quasar. The strong discontinuity in the continuum at 912Å is appropriate to absorption that corresponds to the Ly-alpha and Ly-beta absorption line system at z = 1.3911. The expected far-UV emission lines strengths appropriate for a QSO (assuming solar elemental abundances) were calculated using the photo-ionization code CLOUDY, wherein we assumed a power-law synchrotron flux distribution with slopes that range from -0.5 to -1.5, and ionization and density parameters appropriate for the QSO broad line region. These results predict strong features that correspond to the emission lines identified here. The relative intensities of emission lines present in the lens images A and B were obtained to determine if gravitational lensing leads to flux variations of different ionic species, which sets constraints on the size of the quasar emitting regions.

12.02
LY-α LINE EMISSION IN A FIELD OF SUPER-CLUSTERED DAMPED LY-α ABSORBERS

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The quasar pair Q2138-4427 and Q2139-4434 is separated by 8 arcmin on the sky (δ = 6 Mpc), and they have correlated damped Lyα absorption (DLA) at two redshifts, z = 2.380 and z = 2.853 (Francis, P.J., and Hewett, P.C., 1993, A. J., 105, 1633).

On three nights in September 1993 we imaged the field of Q2138-4427 in B, I, and a narrow band tuned to the DLA at z = 2.853. The observations were carried out with the ESO 3.6m telescope. We find two emission line candidates in the field. The two candidates have line fluxes similar to the three sources found in the field of Q0528-250 (Møller, P., and Warren, S. J., 1993, Astr. Ap., 279, 43) but they are much brighter in the continuum. The two candidates are lying quite far from the quasar, so even if they are spectroscopically confirmed to be Lyα emitters, they are unlikely to be identified with the absorber. Their continuum fluxes make them more likely to be either OII emitters at low redshift, or high redshift AGNs associated with the super-cluster structure reported by Francis and Hewett. Lyα emission sources similar to the one detected in the field of Q0528-250 are not seen. A comparison of these new results with our previous detections will allow us to draw general conclusions on the nature of the damped systems.

12.05
The HST/FOS Ultraviolet Absorption Spectrum of the QSO PG 1522+101


We present an analysis of the absorption line spectrum of the bright QSO PG 1522+101 (x_m = 1.321, V = 15.65, B = 15.8). The data were obtained at a resolution of δ = 1200, using the high resolution gratings G190H and G270H of the HST FOS. The wavelength coverage of the observations is from 1595Å to 3300Å (685A to 1413Å in the QSO rest frame). The spectrum exhibits high signal to noise (between 20 and 40) for most of the wavelength range covered.

We identify 98 lines at a significance level of 4.5σ. Most of these lines are due to Lyman α forest absorption, but we also detect a significant number of intergalactic metal lines as well as interstellar Milky Way absorption. Our aim is to study the evolution of the Lyman forest and metal absorption lines. Furthermore, the high galactic latitude of the QSO (δ = 50°) makes this line of sight ideal for study of the Galactic Halo.

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