Poster Contributions: Continuum studies

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MODELLING THE SOFT X-RAY EXCESS IN E1615+061

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Summary. We report results of an international UV - X-ray campaign in 1990 - 1992 involving the IUE, Rosat and Ginga satellites to observe E1615+061, a Seyfert 1 galaxy with peculiar spectral and intensity behaviour over the last 20 years. The source has been found to be stable in its medium state during the observations. The Ginga (1 - 20 keV) spectrum of E1615+061 is adequately represented by a simple power law with a photon index $\alpha = 1.8 \pm 0.1$. However, $\alpha \sim 2$, as expected for the intrinsic power law component in a reflection model, cannot be ruled out statistically. The Rosat PSPC (0.1 - 2 keV) spectra collected during the All Sky Survey and the AO-1 phase can be well-described by a simple power law ($\alpha = 2.2 \pm 0.1$) with cold absorber ($N_H = 3.5 \pm 0.3 \cdot 10\lambda 20$ H/cm$\lambda 2$). Both the photon index being significantly different than that obtained from the Ginga spectrum and the column density being smaller than the galactic column ($N_H \sim 4.2 \cdot 10\lambda 20$ H/cm$\lambda 2$) give an indication of a soft excess over and above the hard component seen in the Ginga spectrum. E1615+061 has been observed with IUE in 1990 and in 1992. The source was stable and the colour excess E(B-V) derived from the data = 0.1 is in good agreement with that expected from the galactic absorption.

To parameterise the soft excess we fitted the Rosat data with a two-component model consisting of a power law, and a blackbody or thermal bremsstrahlung, with a single galactic absorption term. The column density and the slope of the power law were kept constant. The blackbody temperature was 80 ± 6 eV and 63 ± 12 eV for photon index equal to 1.8 and 2.0, respectively, whereas the bremsstrahlung temperature was 220 ± 40 eV and 115 ± 30 eV for the two cases.

An attempt to model the soft excess seen in the Rosat PSPC spectrum has been made assuming that the soft excess is the high energy tail of a disc spectrum which peaks in the UV part of the spectrum. Additionally it was assumed that there is a hard component contributing to the spectrum from UV to X-rays with parameters as described by the Ginga spectrum. The best fit parameters: the mass of the central source and the mass accretion rate were around $5 \pm 1 \cdot 10\lambda 6\, M_\odot$ and $0.2 \pm 0.04\, M_\odot$/yr, respectively.

Our modelling shows that the soft X-ray excess can be described ($\chi_{red}\lambda 2 < 1.2$) as the high energy tail of an accretion disk spectrum if the intrinsic power law is quite steep ($\alpha = 2$). The main contribution to the residuals in the Rosat PSPC range comes from 0.3 - 0.6 keV, with a tendency for these residuals to increase when the slope gets flatter. The accretion luminosity is $\sim 6.5 \cdot 10\lambda 44$ erg/s for the best fit parameters, i.e. about the Eddington luminosity.

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