ROSAT SPECTRA OF QUASARS

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X–ray observations of AGN with Einstein, EXOSAT and Ginga have shown, that the spectra of quasars in the energy range 2 to 10 keV can be approximately described by a single power law model with a photon index of 1.7 to 2.0. They also suggested that a soft X–ray excess component (below $\approx$ 1 keV) is a common feature in many quasars. In order to investigate whether a soft excess is characteristic for a certain class of objects we analysed the data of the pointed ROSAT PSPC observations of the six radio–loud quasars PG0007+106, PKS0135-247, QSO0537-286, QSO0923+392, PG1225+317, 3C273 and the radio–quiet quasar PG0804+761. In a first step the observed spectra were fitted with an absorbed single power law model. The hydrogen column density was fixed to its galactic value and the normalisation at 1 keV and the spectral index α were the free fit parameters. In order to decide whether a soft component is present in a source, the resulting power law index was compared with the hard X–ray power law index (2-10 keV) determined in the past with other instruments. A steep ROSAT PSPC spectrum indicates the presence of an additional soft X–ray component. In four cases (PKS0135-247, PG0804+761, QSO0923+392, 3C273) we find that the spectra in the PSPC band are considerably steeper than the spectra above 2 keV and therefore suggest the presence of a soft excess. In order to quantify the contribution of the soft excess these spectra were successively fitted with a model containing a hard power law component and an additional soft component described either by a power law, thermal bremsstrahlung or black body model. For the other three members of our sample (0007+106, 0537-286, 1225+317) the fitted power law index is not enhanced. This means that no soft component has been detected, but not necessarily that it does not exist. There are two effects which render more difficult the detection of a soft component in ROSAT spectra, the absorption of photons by interstellar material and the shift of the spectra towards lower energies due to the redshift. Both processes have first an effect on the soft part of the observed spectrum and it is therefore evident, that this leads to a decrease of the sensitivity for soft X–rays of the emitted spectrum. For the three quasars in our sample, where no soft excess has been detected, either the column density (0007+106) or the redshift (0537-286, 1225+317) is especially large and therefore an eventually present soft component could have remained undetected. In these cases we calculated upper limits for the strength of such a soft component (P. Bühler et al., to be published in A&A.)

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