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The ASCA Observations of the Radio Quiet QSOs

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A 100 ks exposure observation of $z=2.078$ Radio-Quiet QSO (RQQ) H1400#10 is obtained in order to determine the spectral properties of high Z RQQ. The spectrum can be well fitted with a single power-law absorbed by Galactic neutral material at a column consistent with HI measurement. Any excessive absorptions must be lower than $5 \times 10^{20} \text{ cm}^{-2}$ at the Galaxy, and $7 \times 10^{21} \text{ cm}^{-2}$ at the source rest frame. No evidence for either a Fe K line emission or a hard tail from the reflection is found. These results are consistent with previous results for other RQQs. The photon slope ($\Gamma = 1.60 \pm 0.06$) is significant flatter than the average RQQs at low redshift.

Using currently available archival ASCA data, we have investigated the relation among medium X-ray spectral index and various broad band properties. The soft and ME X-ray spectral indices are found to be strongly correlated for these RQQs, suggesting that the formation of hard X-ray power-law is somewhat related to the soft X-ray emission. The Γ_{ASCA} is also correlated with the X-ray to optical flux ratio in a sense that stronger X-ray emitter tends to have flatter X-ray spectrum. The latter correlation, probably, is another analogy to that found in the Galactic Black Hole Candidates.

Since most high redshift RQQ hitherto observed by ASCA are selected based on ROSAT detection, therefore biasing toward strong X-ray emitter, the flat spectrum for H1400#10 and those obtained by Vignali et al. (1998) could well be a kind of selection effect. 3 high Z , weak X-ray sources (PG1101-264, He1104-1805 and PG 1247+263) in the ASCA archives do show steep spectrum similar to those at low redshift.