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Investigating optical and near-UV spectroscopic properties of extremely powerful jetted quasars

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Abstract

Quasars have historically been classified into two distinct classes, radio-loud (RL) and radio-quiet (RQ), taking into account the presence and absence of relativistic radio jets, respectively. Although different attempts were made to unify these two classes, there is a long-standing open debate involving the possibility of a real physical dichotomy between them. In this work, we present new spectra of 11 extremely powerful jetted quasars with radio to optical ratio >1000, and redshift 0.35<z<1, that concomitantly cover the low-ionization emission of MgIIλ2800Å and Hβ regions. We aim to quantify broad emission line differences between RL and RQ quasars by using the 4DE1 parameter space and its main sequence (MS), and to check the effect of powerful radio ejection on the low ionization broad emission lines. We found that broad emission lines show large redward asymmetry both in MgII and Hβ. The location of our extreme RL sources in a UV plane looks similar to the optical one, with weak FeII UV emission and broad MgII. We supplement the 11 sources with large samples from previous work. We found that, compared to RQ, extreme RL quasars show larger median Hβ FWHM, weaker FeII emission, larger black hole masses (M_{BH}), lower Eddintong ratio (L_B/L_{Ed}), and a restricted space occupation in the optical and UV MS planes. The differences are more elusive when the comparison is carried out by restricting the RQ population to the region of the MS occupied by RL quasars, albeit an unbiased comparison matching M_{BH} and L_B/L_{Ed} indicates that the most powerful RL quasars display the highest redward asymmetries in the Hβ emission lines.

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