

Application of the Broad Line Region radius-luminosity relation in cosmology

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In the previous works, using the SALT measurements of three luminous quasars, we confirmed the presence of the Broad Line Region radius-luminosity relation for the ultraviolet line of MgII. Together with SDSS-RM as well as Oz-DES datasets, we studied the classical as well as extended versions of the radius-luminosity (RL) relation. Using 78 sources, we simultaneously fitted the parameters of the RL relation as well as the cosmological parameters of six cosmological models (both flat and spatially curved). We found that regardless of the cosmological model, the RL relation is consistent and robust with the scatter of ~ 0.3 dex, which makes it possible to use MgII quasars as standardizable candles. The obtained cosmological constraints are consistent with the BAO+H(z) sample, favouring spatially flat Λ CDM model. However, the current dataset of MgII quasars, when used jointly with the BAO+H(z) sample, does not exclude cosmological models with mild dark energy and a little spatial curvature.

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