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An X-ray spectral and variability study of highly accreting supermassive black holes

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The Eddington ratio λ_Edd is the key parameter that describes the accretion mode of active galactic nuclei (AGN). Among the different modes, high-λ_Edd accretion is particularly fascinating because of its implications in the context of accretion physics, as well as AGN feedback. However, due to their relative paucity in the local Universe (z<0.1), only few dedicated observations of AGN accreting in the high-λ_Edd regime are currently available. To tackle this issue, we exploit the vast database of XMM-Newton serendipitous observations to create a new, large sample of highly accreting AGN named as XMM-Newton High-Eddington Serendipitous AGN Sample (X-HESS). Approximately 40% of the X-HESS AGN has multi-epoch data coverage, disclosing the unprecedented possibility to study not only the spectral but also variability features of high-λ_Edd AGN in much broader intervals of redshift, black hole mass and bolometric luminosity with respect to the bulk of pre-existing highly-accreting AGN samples. Moreover, >60% of the X-HESS AGN dispose of simultaneous optical/UV observation from the OM, providing hints about the interplay between the X-ray corona and the accretion disc. Thanks to the combination of simultaneous optical/UV and X-ray data, we explore the possibility to investigate the renowned Γ-λ_Edd relation in a fully epoch-dependent frame. Evidence of powerful nuclear winds were also found among the X-HESS AGN, enforcing the role of the high accretion mode as an ideal laboratory to study AGN feedback through advanced modelling techniques.

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