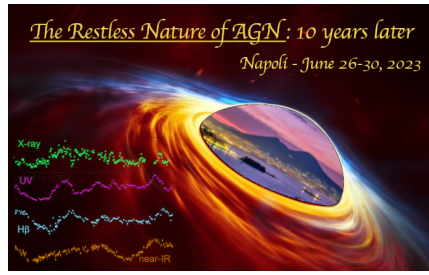


The restless nature of AGN: 10 years later



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A universal variability structure function for disc emission?

The UV-optical continuum emission from accretion discs is known to vary on all timescales, from days to decades. Its statistical description as a random walk as well as deviations from that phenomenology have not given much insight into disc properties.

Here, we report our discovery of a universal variability structure function for quasars, which appears when the observer's clock ticks in units of an orbital timescale of the emitting disc material. This behaviour is consistent with magneto-rotational instabilities being the source of spontaneous variability.

Quasars may all follow the intrinsic relation tightly, while our observations could still be scattered in subtle ways as estimates of the orbital timescale are biased by dust extinction and the viewing angle of the disc. Also, we observe the random walk of windy discs to be offset from the main relation and discuss possible explanations. This line of inquiry offers potential to probe the temperature profile of accretion discs independently of disc reverberation experiments, and should greatly benefit from forthcoming LSST data.

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