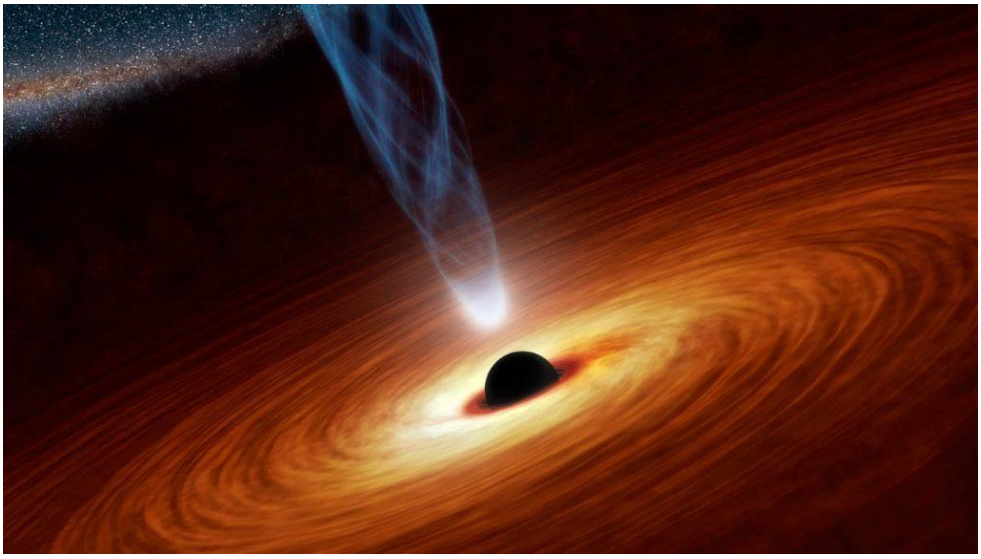
Fluctuation in light curve in the jet of supermassive black holes may help explore emissions from them

Scientists have detected a rare moving blob (region of higher density) or fluctuation in the light curve of the jet of radiations and particles coming out from a supermassive black hole (SMBH) located at the centre of an active galaxy that can provide insight into the underlying emission process of the black hole.

Super-massive black holes in the centres of some active galaxies create powerful jets of radiation and particles travelling close to the speed of light. Attracted by strong gravity, matter falls towards the central black hole as it feeds on the surrounding gas and dust, and as a result, they often outshine their host galaxies.

CTA 102 is a blazar subclass of active galaxy, and its center is SMBH situated at roughly 8 billion light-years away flared during 2016–17, and the emission observed during this flare was significantly higher than its average emission.

Dr. Alok C. Gupta and Dr. P. Kushwaha from Aryabhatta Research Institute of Observational Sciences (ARIES), an autonomous institute under the Department of Science & Technology, Government of India and collaborators Mr. A. Sarkar and Prof. V. R. Chitnis from Tata Institute of Fundamental Research (TIFR), Mumbai, and Prof. P. J. Wiita from The College of New Jersey, USA who gathered Gamma-ray data was from the NASA Fermi-LAT satellite and optical data from a large number of ground-based observatories from across the world of this flare. Simultaneous quasi-periodic oscillations (QPOs) with a period of around 7.6 days were observed in the γ-ray and optical fluxes of CTA 102 during its high optical activity episode in 2016–2017. The findings of the study have been recently published in the scientific journal *'Astronomy & Astrophysics'*. The best explanation for the detected QPO appears to be a region of enhanced emission (blob), moving helically inside the jet, which may help explore emission from black holes and the process behind it.



An image of the relativistic jets of AGN.
Image courtesy: *MIT Kavli Institute for Astrophysics and Space Research*

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