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# Flares from SgrA\*: dynamical probes for strong gravitational and magnetic fields

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## Abstract

Photons emitted from near ultracompact objects carry information not only about their emission environment but also about the spacetime geometry around such objects. In the case of Sagittarius A\*, the supermassive black hole at the centre of the Milky Way, the detected emission in the Near Infrared (NIR) can flare to ten times its quiescent flux. In this Flaring state, the emission can be resolved temporally and spatially by the GRAVITY Instrument and probe the near-event-horizon region around SgrA\*. In this talk, I will report on the new polarimetric and astrometric measurements of NIR Flares obtained with the GRAVITY instrument and showcase the theoretical modelling performed by the GRAVITY Collaboration to interpret the observations. All flares show clockwise motion in the plane of the sky with a period of around an hour, and the polarization vector rotates by one full loop in the same period. These results are consistent with Keplerian motion of a single hot spot close to the innermost stable circular orbit in a predominantly vertical magnetic field configuration and support a single black hole model with a mass of 4.3 million solar masses. Such analysis opens the door to new extreme tests of GR and may be the key to measuring the spin of SgrA\*.

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