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The Galactic Center - a unique laboratory for relativity

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Located at 8kpc only, the Galactic Center allows studying a galactic nucleus in unparalleled detail. With the advent of high-resolution, near-infrared instrumentation in the last decade it became possible to follow individual stellar orbits around the radio source Sgr A *with orbital periods as short as 12 years. The orbits determine the mass of Sgr A to 4 million solar masses,* and thus provide compelling evidence for the massive black hole paradigm. Also, variable flare emission originating from the direct vicinity of the event horizon has been discovered. The next generation near-infrared instrument GRAVITY aims at increasing the resolution further by interferometrically combining the light of the four telescopes of the VLT. The resolution achievable is of order 3 milli-arcsec and will allow monitoring stellar orbits with orbital periods of 1 year only. The relativistic prograde periastron precession gets then accessible astrometrically. The astrometric accuracy of GRAVITY is of order of the event horizon size of Sgr A. *This means that we might be able to measure the orbital motion of the flaring emission, and thus that we might have access to measuring the spin of Sgr A.*

Authors: Dr EISENHAUER, Franck (Max Planck Inst. für Extraterrestrische Physik); GILLESSEN, Stefan (Max Planck Inst für Extraterrestrische Physik)

Presenter: GILLESSEN, Stefan (Max Planck Inst für Extraterrestrische Physik)

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