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A unique laboratory: The Massive Black Hole in the Galactic Center

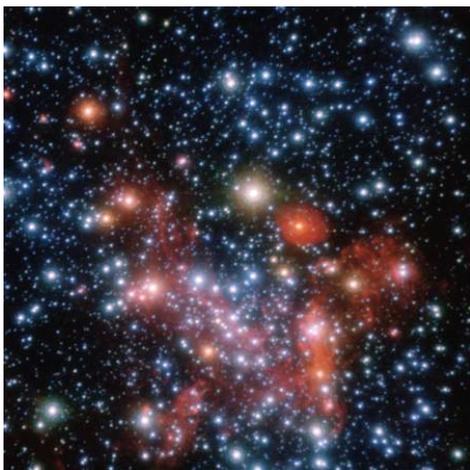
Dr. Stefan Gillessen

Max Planck Institute for Extraterrestrial Physics

Dr. Gillessen studied physics in Heidelberg, Germany. He got his PhD with the HESS collaboration, Max-Planck-Institute for nuclear physics, building a stereoscopic system of Cerenkov telescopes in Namibia, where his part is the pointing models of the telescope. Then he moved to Max-Planck-Institute for extraterrestrial physics, Garching, IR/submm group, and Worked on high-resolution infrared observations of the Galactic Center, in particular stellar orbits. He is part of the GRAVITY consortium, building a next-generation interferometer for the Very Large Telescope Interferometer in Chile.



Abstract



The Milky Way Center harbors the closest galactic nucleus in a distance of just 8 kpc. Using high-angular resolution techniques in the near-infrared, extremely small spatial scales become accessible. Most astonishing are the observations of stellar orbits showing that the gravitational potential to a scale of a few light hours is dominated by a concentrated mass associated with the compact radio source Sgr A* , which must be a massive black hole, beyond any reasonable doubt. From the orbits, the distance to the Galactic Center can be derived geometrically, and the mass of the black hole is determined dynamically with a statistical uncertainty of 1.5% only. While the stars orbiting can be used as ideal test particles, their existence poses a paradox of youth: the stars are too young to have migrated from far, but they cannot have formed at their current location deep in the gravitational potential of the black hole. At somewhat larger radii, a

second population of young stars is found. These O/WR stars in the central 0.5 parsec reside in two warped disks. They probably have formed in a starburst 6 Myr ago in gaseous accretion disks with a top-heavy initial mass function.

All are welcome! Tea, coffee, biscuits will be served at 2:45 P.M.

You are welcome to nominate speakers to Shude Mao (shude.mao@gmail.com), Licai Deng (licai@bao.ac.cn), Xuelei Chen (xuelei@cosmology.bao.ac.cn).