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Title: The mean infrared emission of Sagittarius A*
Authors: Schödel, R.; Morris, M. R.; Muzic, K.; Alberdi, A.; Meyer, L.; Eckart, A.; Gezari, D. Y.
Affiliation: AA(Instituto de Astrofísica de Andalucía (CSIC), Glorieta de la Astronomía s/n, 18008, Granada, Spain rainer@iaa.es), AB(UCLA Division of Astronomy and Astrophysics, Physics and Astronomy Building, 430 Portola Plaza, Box 951547, Los Angeles, CA, 90095-1547, USA), AC(Department of Astronomy and Astrophysics, University of Toronto, 50 St. George Street, M5S 3H4, Toronto ON, Canada), AD(Instituto de Astrofísica de Andalucía (CSIC), Glorieta de la Astronomía s/n, 18008, Granada, Spain), AE(UCLA Division of Astronomy and Astrophysics, Physics and Astronomy Building, 430 Portola Plaza, Box 951547, Los Angeles, CA, 90095-1547, USA), AF(I. Physikalisches Institut, Universität zu Köln, Zülpicher Str. 77, 50937, Köln, Germany), AG(NASA/Goddard Space Flight Center, Code 667, Greenbelt, MD, 20771, USA)
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Abstract：Context. The massive black hole at the center of the Milky Way, Sagittarius A* (Sgr A*) is, in relative terms, the weakest accreting black hole accessible to observations. It has inspired the theoretical models of radiatively inefficient accretion. Unfortunately, our knowledge of the mean SED and source structure of Sgr A* is very limited owing to numerous observational difficulties. At the moment, the mean SED of Sgr A* is only known reliably in the radio to mm regimes.
Aims: The goal of this paper is to provide constraints on the mean emission from Sgr A* in the near-to-mid infrared.
Methods: Sensitive images of the surroundings of Sgr A* at 8.6 μm, 4.8 μm , and 3.8 μm were produced by combining large quantities of imaging data. Images were produced for several observing epochs. Excellent imaging quality was reached in the MIR by using speckle imaging combined with holographic image reconstruction, a novel technique for this kind of data.
Results: No counterpart of Sgr A* is detected at 8.6 μm. At this wavelength, Sgr A* is located atop a dust ridge, which considerably complicates the search for a potential point source. An observed 3σ upper limit of ~10 mJy is estimated for the emission of Sgr A* at 8.6 μm, a tighter limit at this wavelength than in previous work. The de-reddened 3σ upper limit, including the uncertainty of the extinction correction, is ~84 mJy . Based on the available data, it is argued that, with currently available instruments, Sgr A* cannot be detected in the MIR, not even during flares. At 4.8 μm and 3.8 μm, on the other hand, Sgr A* is detected at all times, at least when considering timescales of a few up to 13 min. We derive well-defined time-averaged, de-reddened flux densities of 3.8 ± 1.3 mJy at 4.8 μm and 5.0 ± 0.6 mJy at 3.8 μm. Observations with NIRC2/Keck and NaCo/VLT from the literature provide good evidence that Sgr A* also has a fairly well-defined de-reddened mean flux of 0.5-2.5 mJy at wavelengths of 2.1-2.2 μm.
Conclusions: We present well-constrained anchor points for the SED of Sgr A* on the high-frequency side of the Terahertz peak. The new data are in general agreement with published

theoretical SEDs of the mean emission from Sgr A*, but we expect them to have an appreciable impact on the model parameters in future theoretical work.