

GC-IRS13E - An association of three puzzling early-type stars

T. K. Fritz (1), S. Gillessen (1), K. Dodds-Eden (1), F. Martins (2), H. Bartko (1), R. Genzel (1,3), T. Paumard (4), T. Ott (1), O. Pfuhl (1), S. Trippe (5), F. Eisenhauer (1), D. Gratadour (4)

1: Max Planck Institut fuer Extraterrestrische Physik, Garching, Germany;

2: GRAAL-CNRS, Universite Montpellier II -UMR5024, France;

3: Department of Physics, University of California, Berkeley, USA;

4: LESIA, Observatoire de Paris, CNRS, UPMC, Universite Paris Diderot, France;

5: Institute de radioastronomie Millimetrique, Grenoble, France;

We present a detailed analysis of high resolution near-infrared imaging and spectroscopy of the potential star cluster IRS13E very close to the massive black hole in the Galactic Center. We detect 19 objects in IRS13E from Ks-band images, 15 of which are also detected reliably in H-band. We derive consistent proper motions for these objects from the two bands. Most objects share a similar westward proper motion. We characterize the objects using spectroscopy (1.45 to 2.45 micrometer) and (narrow-band) imaging from H- (1.66 micrometer) to L'-band (3.80 micrometer). Nine of the objects detected in both Ks- and H-band are very red, and we find that they are all consistent with being warm dust clumps. The dust emission may be caused by the colliding winds of the two Wolf-Rayet stars in the cluster. Three of the six detected stars do not share the motion or spectral properties of the three bright stars. This leaves only the three bright, early-type stars as potential cluster members. It is unlikely that these stars are a chance configuration. Assuming the presence of an IMBH, a mass of about 14000 solar masses follows from the velocities and positions of these three stars. However, our acceleration limits make such an IMBH nearly as unlikely as a chance occurrence of such a star association. Furthermore, there is no variable X-ray source in IRS13E despite the high density of dust and gas. Therefore, we conclude that it is unlikely that IRS13E hosts a black hole massive enough to bind the three stars.

Reference: The Astrophysical Journal

Status: Manuscript has been submitted

Weblink: <http://arxiv.org/abs/1003.1717>

Comments: 17 pages, 13 figures, 2 tables

Email: tfritz@mpe.mpg.de