

Z324a **Joint Analysis of Proper Motion and Radial Velocity of GCIRS13E; New Mass Estimation of the IMBH Candidate**

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The Galactic Center IRS13E cluster is suspected to have an intermediate mass black hole (IMBH) in its interior. High-resolution ALMA observations of the H30 $\alpha$  recombination line have revealed an elliptical object in it. The kinematics along its long axis appears as a tilted linear feature on the PV diagram. Because the feature is fairly bulging, so random motion may be significant in it. Such linear feature usually suggests that there is a rotating disk-like object around a central body. When we assume that the disk is thin and the observed aspect ratio is caused by the tilt angle, the mass of the central body is  $\sim 2 \times 10^4 M_{\odot}$ . Although this mass is still within the upper limit of the IMBH derived from the positional stability of Sgr A\*, both affirmative and negative discussions are induced actively. It may not be good to assume that the disk is thin because of observed large random motion in it. Recently, in the ALMA observation of continuum emission at 230 GHz, the disk is resolved into smaller components and their proper motions were measured. The derived proper motions are approximately along the long axis of the elliptical object. If these components were distributed on the disk and the proper motions are caused by the rotation of the disk, the proper motion and radial velocity could be combined to estimate the kinematics of the disk accurately. The mass of the central body using the new analysis is  $\sim 3 \times 10^3 M_{\odot}$ . The smaller mass is consistent with the radio and X-ray quiescence of this object.