S15a The Second Galactic Center Black Hole?; Possible Detection of Accreting Ionized Gas onto the Galactic Center IRS13E

Masato Tsuboi, Yoshimi Kitamura (ISAS/JAXA), Takahiro Tsutsumi (NRAO), Makoto Miyoshi (NAOJ), Kenta Uehara (the University of Tokyo), Ryosuke Miyawaki (J.F. Oberlin University), Atsushi Miyazaki (Japan Space Forum)

The IRS 13E complex is a very intriguing IR object identified within 0.2 pc from the Galactic center, Sgr A*. Although the complex should be disrupted by the strong tidal force of Sgr A* ($M \sim 4 \times 10^6 M_\odot$), the main member stars seem to be physically bound. One of the possible speculations is that a dark mass, like an intermediate mass black hole (IMBH) in the complex prevents its disruption although there are some objections to accept the IMBH.

We analyzed the DDT observation of the Galactic Center with ALMA and obtained the channel maps with very high resolution (0.4" $\times$ 0.3") and very high sensitivity (0.8 mJy/beam) in Hydrogen recombination line, H30α. We found an ionized gas with a very wide velocity width ($\Delta V \gtrsim 500$ km/s) toward the IRS13E complex with ALMA. Our detected ionized gas is very compact ($\lesssim$ 0.4"). The ionized gas is presumably accreting onto the IMBH embedded in the IRS 13E complex. The enclosed mass is estimated to be $10^{4-5} M_\odot$ from the compactness and the wide velocity width. This mass is enough to bound the main member stars. However, the mass apparently conflicts with the upper limit mass of the IMBH around Sgr A* which has been derived by the long-term VLBA astrometry.