

R12b Sub-millimeter Detection of the IR Stars around Sgr A* by ALMA

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The Nuclear star cluster (NSC) is a unique object in the galaxy because the cluster is centered at the Galactic center black hole, Sgr A*, and concentrates within $r < 0.5$ pc. The NSC contains 100 OB and WR stars. It may be difficult to make the cluster near Sgr A* in a way by which stars are usually formed in the disk region because both the tidal force of Sgr A* and the strong Lyman continuum radiation from the cluster itself must have a serious effect on the star formation. Therefore, it is still an open question how the NSC has formed. In any star formation mechanism, there may be some signatures in the motion and distribution of the stars around Sgr A*. Such studies have been performed by IR telescopes (IRTs). However, ALMA is superior to them as a precision astrometry tool for the NSC because ALMA can always observe the position of Sgr A* but IRTs cannot always. We observed the NSC at 340 GHz (ALMA#2015. 1.01080.S). The angular resolution using uniform weighting is $0''.10 \times 0''.09$. The well-known IR objects, IRS16 cluster, IRS13E complex, IRS21 cluster and so on, are first detected in the sub-millimeter continuum map. Most of them are WR stars and O stars except for IRS7, which is a cool star. We derived the proper motions of the members of the IRS13E complex from comparison between this observation and recent JVL A observation (Yusef-Zadeh+ 2015) on trial. Because ALMA has potentially a much smaller beam size than VLA, astrometry with ALMA is promising.