

P116b First ALMA Results on Young Binaries in Lupus from the SOLA Project

Masao Saito, Kazuya Saigo (NAOJ), Itziar de Gregorio-Monsalvo (JAO), Adele Plunkett (ESO), Koraljka Muzic (U. Lisbon), Rebekka Grellmann (U. Koeln), Satoko Takahashi, Antonio Hales, Christian Lopez (JAO) and the team SOLA

We started the international SOLA (Soul of Lupus with ALMA) consortium, centred at the Joint ALMA Observatory. We are conducting multi-wavelength studies of the Lupus Molecular Clouds and their star formation processes. The long-term goal is to exploit ALMA and other facilities to establish the Lupus region as a prototypical southern low-mass star-forming region. As part of the SOLA research activities, we carried out an unbiased study with ALMA to investigate the binary properties at the Class 0/I stage in Lupus I, III, and IV at a spatial resolution of 20 - 30 au ($\sim 0.15''$) and binary formation, a major mode of star formation in most nearby star forming regions. The distribution of binary separations and mass ratios depend on the details of infall and accretion onto circumbinary and/or the circumstellar disks that form and interact with the stars and with each other as these young stellar systems form and evolve. Surprisingly, tentative results indicate that the binary population in the Class 0/1 stages identified in submillimeter continuum emission in Lupus is very low and only two protobinary candidates are identified; J160708-391408 with its separation of 98 au and Sz-95 with 83 au separation. Interestingly the flux ratio of the primary to the secondary star is very different for these two candidates (0.44 for J160708, <0.1 for Sz-95) suggestive of different formation mechanisms. We will combine our data to public ALMA and VLT data to investigate binary properties in Lupus.