

Unveiling the early formation of high-mass stars in the Central Molecular Zone

- Daniel Walker

The physics of star formation and stellar feedback play a leading role in shaping the evolution of galaxies, and it is the most massive stars that provide a dominant source of feedback. A significant population of very massive stars exists at the centre of the Galaxy, particularly in the young massive clusters there. Understanding how such stars form in the turbulent environment of the Galactic centre is crucial if we are to understand the extent to which environmental conditions influence their formation and evolution. In this talk, I will present the recent discovery of a sample of potential precursors to very massive stars in the Galactic centre dust-ridge. A combination of band 3 and 6 ALMA observations yields the first ever sub-mm view of massive protostars down to scales of 500 AU (0.06") in this extreme region. I will discuss how these observations inform our understanding of fragmentation and low-mass star formation in the vicinity of young high-mass protostars, and how this compares with theories of their formation. I will also present analyses of the rich molecular line emission, which is used determine the temperature and density structure and reveals the presence of complex organic chemistry, bi-polar outflows and potential disk-like kinematic features associated with these young massive protostars.

Cores and embedded objects