EUROPEAN NETWORK
14th EVN Symposium &
Users Meeting
Granada, October 8-11 2018

Revealing magnetic fields towards massive protostars: a multi-wavelength approach using masers and dust

Wouter Vlemmings, Gabriele Surcis

Magnetic fields play a significant role during star formation processes, hindering the fragmentation and the collapse of the parental cloud, and affecting the accretion mechanisms and feedback phenomena. However, several questions still need to be addressed to clarify the importance of magnetic fields at the onset of massive star formation, such as at what evolutionary stage their action becomes relevant, how strong they are, and at what spatial scales they act.
Furthermore, the magnetic field parameters are still poorly constrained especially at small scales, i.e. few astronomical units from the central object, where the accretion disc and the base of the outflow are located. Thus we need to probe magnetic fields at different scales, at different evolutionary steps and possibly with different tracers.
I will show that the magnetic field morphology around high-mass protostars can be successfully traced at different scales by observing maser and dust polarised emission. A confirmation that they are effective tools is indeed provided by our recent results from 6.7 GHz MERLIN observations of the massive protostar IRAS 18089-1732, where we found that the small-scale magnetic field probed by methanol masers is consistent with the large-scale magnetic field probed by dust.
Moreover I will present results obtained from our ALMA Band 7 polarisation observations of G9.62+0.20, which is a massive star-forming region with a sequence of cores at different evolutionary stages. We resolve several protostellar cores embedded in a bright and dusty filamentary structure. I will then discuss the magnetic field morphology in different cores and different evolutionary stages and I will compare its strength with previous estimates obtained by maser observations.