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Self-similarity of the magnetic field in G31.41+0.31 from cloud to circumstellar scales

Wednesday 7 May 2025 12:20 (20 minutes)

In this presentation, I will discuss the magnetic field properties at all spatial scales (cloud, core, disk) of one of the best studied high-mass star-forming regions, the massive protocluster G31.41+0.31. Dust polarization observations of this massive core carried out with the SMA at 870 microns and 1"(3750 au) have revealed one of the most clear examples up to date of an hourglass-shaped magnetic field in the high-mass regime. ALMA observations at higher angular resolutions have revealed that the magnetic field maintains its hourglass-shaped morphology down to circumstellar scales (~300 au). All this is supported by the modelling of the polarized emission, which confirms the poloidal shape of the magnetic field. Recent JCMT polarization observations of the cloud indicate that the orientation of the hourglass B-field observed at core and circumstellar scales is preserved at large scales. This self-similarity in the B-field orientation suggests that the field is connected from cloud to circumstellar scales despite the difference in density and spatial scales.

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