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Jet precession and synchronous outbursts in the binary (triple?) protostar SVS13A

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The role of multiplicity and close stellar encounters in accretion and ejection bursts in young stars is a debated issue (Reipurth et al. 2014; Audard et al. 2014, and references therein). An interesting target of study in this context is SVS 13A, a 0.3" (70 au) binary solar-type protostar (VLA4A,VLA4B; Anglada et al. 2000) with multiple signs of ejection bursts. SVS 13A is the candidate source of the HH7–11 chain of optical /H2 knots (Davis et al. 2000), drives high-velocity CO bullets (Bachiller et al. 2000), and hosts a small scale atomic jet with H2 arcs (Hodapp & Chini 2014 and refs therein). Here we present the highest angular resolution study in the millimeter domain (0.3"-0.8") of the SVS13 A system in dust continuum, CO, SiO and SO, obtained in the frame of the CALYPSO (Continuum And Lines in Young ProtoStellar Objects) Large Program at the IRAM Plateau de Bure interferometer. The source of the molecular jet and its precessing structure are revealed in unprecedented detail. In particular, we show that the CO bullets and the HH7-11 atomic knots actually trace two different outflows that undergo synchronous major outbursts every 300yrs, probably triggered by orbital interactions. We also find that the unusually large rotation reported across the CO bullets by Chen et al. (2016) is most likely an artefact of the strong jet precession and time variability, and that a third outflow source maybe present in the system (see Lefèvre et al. 2017 for full details).

Contribution

Talk

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