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The power of PolyFiX at NOEMA: new insights into sulfur chemistry in DM Tau

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We performed a deep search for CCS, SO, SO₂, OCS, H₂S, H₂CS and other molecules in the DM Tau protoplanetary disk at 2mm with PolyFiX@NOEMA. With a beam of ~2"x1" and a spectral resolution of 0.3 km/s,

a high sensitivity of ~3.8 mJy/beam was achieved. We detected o-H₂S, o-H₂CS, and DNC (first time in DM Tau)

as well as H¹³CO⁺, N₂D⁺, and, tentatively, HC₃N. We have not detected SO₂, our main target molecule. We used the

non-LTE radiative transfer code RADEX to derive disk-averaged column densities and their upper limits. These values,

together with our previous ALMA CS data were used for disk chemical modeling. The presence of CS and the lack of

SO₂ in the DM Tau disk molecular layer can only be reliably explained by the disk model with a non-solar gas-phase C/O ratio

of ~1, supporting previous findings.