

THE ELUSIVE METHYL CATION DISCOVERED BY JWST IN A PLANET FORMING DISK ^a

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The methyl cation (CH_3^+), one of the simplest cations, is postulated to play a pivotal role in the chemistry of interstellar and circumstellar environments, but remains so far elusive outside the Solar System. We report the detection of a series of infrared lines in a protoplanetary disk in Orion using the JWST, which we attribute to CH_3^+ . The presence of CH_3^+ results from the hot UV-driven chemistry, initiated at the surface of the disk by the nearby massive stars of the Trapezium cluster. The detection of this species, which is at the root of carbon chemistry in space, opens the possibility to study yet unexplored pathways of hot gas-phase organic chemistry at play in planet forming disks and beyond.

^aThe authors would like to recognize the PDRS4ALL extended core team, pdrs4all.org