

Bulletin of the AAS • Vol. 55, Issue 2 (AAS241 Abstracts)

Planet Formation in the Binary Environment — An ALMA Study of FO Tau

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Published on: Jan 31, 2023

URL: <https://baas.aas.org/pub/2023n2i368p06>

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The majority of Sun-like stars form with binary companions, and their dynamical impact profoundly shapes the formation and survival of their planetary systems. Demographic studies have shown that close binaries ($a < 100$ au) have suppressed planet-occurrence rates compared to single stars, yet a substantial minority of planets do form and survive at all binary separations. To identify the conditions that foster planet formation in binary systems, we have obtained high-angular-resolution, mm interferometry for a sample of disk-bearing binary systems with known orbital solutions. In this poster, we present the case study of a young binary system, FO Tau ($a \sim 22$ au). Our ALMA observations resolve dust continuum (1.3 mm) and gas (CO J=2-1) from each circumstellar disk allowing us to trace the dynamical interaction between the binary orbit and the planet-forming reservoir. With these data we determine individual disk orientations and masses, while placing these measurements in the context of a new binary orbital solution. Our findings suggest that the FO Tau system is relatively placid, with observations consistent with alignment between the disks and the binary orbital plane. We compare these findings to models of binary formation and evolution, and their predictions for disk retention and planet formation.