

# Laboratory modelling of equatorial accretion channels in young stellar objects

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The dynamics of matter accretion onto the surface of young stellar objects (YSOs) has been the subject of intense research in the past few decades. Due to limitations of the state-of-art instrumentation, the exact dynamics and morphology of the processes taking place on the scales of stellar objects have not been resolved. The equatorial accretion scenario, caused by the development of the Rayleigh–Taylor (RT) instability at the disk edge, was suggested by accurate three-dimensional magnetohydrodynamic (MHD) modelling [1]. We investigate the possibility of an RT instability developing at the border of an accretion disk that may contribute to the triggering of mass accretion onto the protostar. We conducted a laboratory experiment, in which we explored the development of the RT instability of a laser-created plasma stream propagating in a vacuum across an externally applied magnetic field and examined the scalability of the laboratory plasma and of the process of matter accretion according to the tongue formation scenario [2]. As we verify that the laboratory plasma scales favorably to accretion inflows of YSOs, our laboratory results support the argument in favor of the possibility of the RT-instability-caused equatorial tongue accretion scenario in the astrophysical case.

- [1] Kulkarni A K and Romanova M M 2008 *Mon. Not. R. Astron. Soc.* **386** 673–687
- [2] Burdonov K, Yao W, Sladkov A, Bonito R, Chen S, Ciardi A, Korzhimanov A, Soloviev A, Starodubtsev M, Zemskov R *et al* 2022 *Astron. Astrophys.* **657** A112