
Massive star formation: a tale of accretion, ejection and multiplicity

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Abstract

Despite observational clues of disk-mediated accretion, molecular outflows, and large samples showing that massive stars are often located in multiple stellar systems, the mechanisms behind these statements remain poorly understood. In this talk, I will review the main results obtained during my PhD, using radiation-(magneto-)hydrodynamical simulations. First, I will present the hybrid radiative transfer method (RAMSES-RT+FLD) recently implemented in RAMSES, then focus will be made on the debated formation of Rayleigh-Taylor instabilities in the radiative cavities surrounding massive protostars, which could act as an accretion channel (MR+20). Then, I will present the first simulations of massive star formation including the hybrid radiative transfer method and non-ideal MHD (ambipolar diffusion). Using these runs, we identify the magnetic or radiative origin of massive protostellar outflows (MR+21b), focus on the disk properties and on how turbulence and magnetization influence stellar multiplicity (MR+21a).

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