

Extract virialized structures in MHD simulations

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The origin of the stellar initial mass function (IMF) and its relationship with the core mass function (CMF) remains one of the big questions of star formation. The way cores are defined is crucial in shaping the CMF, however their definition remains unclear. Nowadays, cores are mostly detected in observations and simulations through their column or volume density, using algorithms like *getsf* ([Men'schikov 2021](#)) or *HOP* ([Eisenstein & Hut, 1998](#)). If this approach is consistent with the fact that cores are overdensities, it ignores all the physical processes associated with their formation.

We want to develop an extraction tool to define pre-stellar cores based on their energy. Using the virial theorem, we aim to detect collapsing structures considering all the physics that affects them: density distribution, temperature, velocity and magnetic fields.

This is achieved on RAMSES MHD simulation outputs, in which all these quantities are known in 3D.