

EXTRACTION OF A SECOND POWER-LAW TAIL OF THE (COLUMN-)DENSITY DISTRIBUTION IN STAR-FORMING CLOUDS

LYUBOV MARINKOVA¹, TODOR VELTCHEV^{1,2}, SAVA DONKOV³

¹*University of Sofia, Faculty of Physics, 5 James Bourchier Blvd.,
1164 Sofia, Bulgaria*

²*Universität Heidelberg, Zentrum für Astronomie, Institut für Theoretische
Astrophysik, Albert-Ueberle-Str. 2, 69120 Heidelberg, Germany*

³*Department of Applied Physics, Faculty of Applied Mathematics,
Technical University of Sofia*

E-mail: ln@phys.uni-sofia.bg

The emergence and development of a power-law tail (PLT) at the high-density end of the observed column-density distribution is thought to be indicative for advanced evolution of star-forming molecular clouds. As shown from many numerical simulations, it corresponds to a morphologically analogous evolution of the mass-density distribution. The latter may display also a second, shallower PLT at the stage of collapse of first formed protostellar cores (Kritsuk et al. 2011). However, it is difficult to estimate the parameters of this second PLT due to resolution constraints. To solve the problem, we extend the method for extraction of single PLTs from arbitrary density distributions, suggested by Veltchev et al. (2019), and apply it to a set of hydrodynamical simulations of isothermal self-gravitating clouds with high level of refinement in the high-density zones. The results confirm the emergence of a shallower second PLT at timescales, comparable with the free-fall time of the average density in the box.

References

- Kritsuk, A., Norman, M., Wagner, R., 2011, *ApJ*, **727**, L20.
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