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Mass-density relationship in molecular cloud clumps

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We study the mass-density relationship $n \propto \rho^x$ in molecular cloud clumps, considering various relations between the gravitational, kinetic, internal and magnetic energy. Clumps are described statistically, with a density distribution that reflects a lognormal probability density function (pdf) in turbulent interstellar medium. Two principal sets of solutions are obtained: a) $-2 < x < 0$, with a pronounced scale dependence of the parameter x ; and, b) $0.02 < x < 0.4$, where x is scale-free or weakly dependent on the spatial scale. The dependence of the solution on each chosen method is presented and briefly discussed.

Comments: Revised version of a conference paper, published in Proceedings of the "Days of Physics" (in Bulgarian), Sofia, ISSN 1313-9576, p. 83; comments are welcomed

Subjects: **Solar and Stellar Astrophysics (astro-ph.SR)**; Galaxy Astrophysics (astro-ph.GA)

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