Impact of ionization compression on turbulent molecular clouds, and dating of OB associations.

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The expansion of hot ionized gas from an Hii region into a turbulent molecular cloud compresses the material and leads to the formation of dense continuous layers as well as pillars and globules in the interaction zone. This feedback should also impact the probability distribution function (PDF) of the column density around the ionized gas. We aim to quantify this effect and investigate its link to the Initial Mass Function (IMF) using Herschel column density maps and 3D simulations with the HERACLES code. The double-peaked/enlarged shape of the PDF in high-mass star-forming regions could impact the gravo-turbulent scenario used to derive the CMF supposed to be at the origin of the IMF [1].

We derived also an analytical solution that follows the expansion of the region in a turbulent medium and test is against 1D and 3D simulations. From the corresponding 1D simulations, we computed a grid of models that can be used to estimate the age of large sample of OB associations. We applied the method to the HRDS survey and tested it on well-known regions. This method could also be used for the dating of extra-galactic Hii regions [2].

Références

[1] Tremblin, P., Audit, E., Minier, V., Schmidt, W., & Schneider, N. 2012, A&A, 546, 33
[2] Tremblin P., Anderson L. D., Didelon P., Raga A. C., et al. A&A in press, arxiv:1406.1801