Rome Joint Astrophysics Colloquia

The Central Problem of Star Formation: Why So Slow?

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The Central Problem of star formation has been clear for over 40 years: simple estimations predict star formation rates more than 100 times what is observed in the Milky Way and other galaxies. Much ingenious theoretical work has been expended to solve this problem, enhancing our understanding of turbulence and feedback in molecular clouds, but the fundamental problem remains. This situation suggests a reconsideration of the basic assumption that underlies the problem: that molecular clouds are bound entities. In the most complete catalog of structures from CO emission maps, most molecular clouds are unbound, ameliorating the problem. Combining this information with theoretical models of how the star formation rate depends on the initial virial parameter, along with considerations of how metallicity affects the conversion of CO luminosity into mass, provides a solution to the Central Problem for the Milky Way. The variation of star formation rate with Galactocentric radius can also be predicted and finds good agreement with the recent results obtained from the galactic distribution of the star forming clumps identified in the Hi-GAL survey.

Wednesday 20 March 2024, time 11:00 CET

Join in person at IAPS-INAF Roma (aula IB09)
or online on Zoom at https://rebrand.ly/JAC-Evans

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