
Thesis subject

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Subject's title: Dynamics and star formation in the Galaxy: an extragalactic perspective

Subject description:

Star formation is a highly dynamical process on all spatial scales, strongly impacted by the environment. Recent studies in external galaxies (Schruba et al. 2019, Schinnerer et al. 2019, Gomez-Lopez et al. 2019) indicate that the dynamical environment play a key role in the star formation process. However, the lack of resolution renders difficult the interpretation of the results.

In our Galaxy, the star formation process is resolved on all scales from molecular clouds (hundreds of pc, see Veneziani et al. 2017) down to individual cores (at the milli-parsec scale, see Figueira et al. 2018). Star Formation Rate (SFR) and Star Formation Efficiency (SFE) maps can be derived and compared with the local dynamical conditions, such as the level of turbulence. The comparison of these resolved quantities in the Galaxy and their understanding as a function of the environment (dynamical state, location in the Galaxy, density, evolution stage) can shed light on the dynamical processes governing star formation in external galaxies.

We propose to use available data on the Galaxy to derive the star formation laws on different scales, as a function of the dynamical environment. These laws will be compared with state-of-the art models of Galactic star formation. Results of observations and simulations will then be compared with recently obtained high-resolution data in external galaxies (such as the PHANGS survey, Schinnerer et al. 2019) to bringing the gap between our knowledge of the star formation process in the Galaxy and the one proposed in external galaxies.

Bibliography:

Figueira, M. et al. 2018, A&A, 616, L10

Gomez-Lopez, J. et al. 2019, A&A, 631, A71

Schinnerer, E. et al. 2019, Msngr, 177, 36

Schruba, A. et al. 2019, ApJ, 883, 2

Veneziani et al. 2017, A&A, 599, A7