
Explaining the Schmidt-Kennicutt law: the crucial role of large-scale turbulent driving

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Abstract

What regulates star formation and how to explain the Schmidt-Kennicutt (SK) law is a longstanding issue. In this talk, I'll present simulations of a kiloparsec cube section of a galaxy that show that stellar feedback is sufficient to reduce the star formation rate (SFR) to the level of the SK law in Milky Way-like galaxies but not in high-redshift gas-rich galaxies. This suggests that another type of support should be added, such as the external driving of turbulence created by the large galactic scales. Assuming that the Toomre parameter is close to 1, we inferred a typical turbulent forcing. When it is applied in our simulations, the SFR closely follows the SK relation. I will also present the ongoing work to constrain turbulence from galactic scale simulations.

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