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Abstract for an Invited Paper
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The Formation of Molecular Clouds: Insights from Numerical Models¹

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Galactic star formation occurs at a surprisingly low rate. Yet, recent large-scale surveys of dark clouds in the Galaxy show that one rarely finds molecular clouds without young stellar objects, suggesting that star formation should occur rapidly upon molecular cloud formation. This rapid onset challenges the traditional concept of “slow” star formation in long-lived molecular clouds. It also imposes strong constraints on the physical properties of the parental clouds, mandating that a cloud’s structure and dynamics controlling stellar birth must arise during its formation. This requires a new approach to study initial conditions of star formation, namely addressing the formation of molecular clouds. Taking into account the observational constraints, I will outline the physics of flow-driven molecular cloud formation. I will discuss the relevance and the limitations of this scenario for setting the star formation efficiency in our Galaxy and beyond.

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