P119a Insights on the Sun birth environment in the context of star-cluster formation in hub-filament systems

Doris Arzoumanian (NAOJ), Sota Arakawa (JAMSTEC), Masato I. N. Kobayashi (NAOJ), Kazunari Iwasaki (NAOJ), Kohei Fukada (Osaka University), Shoji Mori (Tohoku University), Yutaka Hirai (University of Notre Dame, USA), Masanobu Kunitomo (Kurume University), M. S. Nanda Kumar (University of Porto), Eiichiro Kokubo (NAOJ)

Molecular filaments are observed to be the main sites of Sun-like star formation, while massive stars form in dense hubs, at the junction of multiple filaments. The role of hub-filament configurations has not been discussed yet in relation to the birth environment of the solar system and to infer the origin of isotopic ratios of Short-Lived Radionuclides (SLR, such as ^{26}Al) of Calcium-Aluminum Inclusions (CAIs) observed in meteorites. In this work, we present simple analytical estimates of the impact of stellar feedback on the young solar system forming along a filament of a hub-filament system. We suggest that the host filament can shield the young solar system from the stellar feedback, both during the formation and evolution of stars (stellar outflow, wind, and radiation) and at the end of their life (supernovae). We show that the young solar system formed along a dense filament can be enriched with supernovae ejecta (e.g., ^{26}Al) during the formation timescale of CAIs. We also propose that the streamers recently observed around protostars may be channeling the SLR-rich material onto the young solar system. We conclude that considering hub-filament configurations as the birth environment of the Sun is important when deriving theoretical models explaining the observed properties of the solar system.