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Properties of Filamentary Structures in A Simulated Molecular Cloud and How They Evolve Over Time GINA CHEN, STELLA OFFNER, HOPE CHEN, University of Texas at Austin — Star formation occurs in molecular clouds, which contain networks of filamentary structures. The properties of these filamentary structures are not yet well understood. In this project, we measure the physical properties of filaments within a simulated molecular cloud and determine how they correlate with star formation and how they change over time. We use the Computational Ridge Identification with SCMS for Python (CRISPy) package to identify density ridges. From the ridges, we obtain filamentary spines, which we cut into segments about 0.25pc long. A profile of the filament is generated for each segment using RadFil, a package for building filament radial density profiles. We fit the profiles with Gaussian and Plummer functions, as well as a two component Gaussian function. We show that the majority of segments are best fit by a two-component function. In the simulation, regions of high density are converted into sink particles, which represent stars or star systems. The majority of filaments within 0.05pc of a sink particle are also best fit by a two-component function. The narrower of the two Gaussians has a width of about 0.08pc, consistent with recent observational results. This was consistent through multiple timesteps of the simulation, ranging over about 900,000 years.

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