Abstract Submitted
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Statistical Multi-Component Fitting in the Orion A Molecular Cloud[1] RUBY FULFORD, University of Arizona, National Radio Astronomy Observatory (NRAO), BRIAN SVOBODA, NRAO, DAVID MEIER, New Mexico Institute of Mining and Technology, NRAO, JUERGEN OTT, NRAO — Though integral to the structure and chemical composition of our universe, the details of high-mass star formation remain an open problem. The Integral Shaped Filament (ISF) of the Orion A Molecular Cloud is the closest massive star forming region to Earth, and is therefore essential to the study of massive star formation. We use NestFit, a Bayesian software framework for spectral line decomposition, to fit up to two gas velocity components to observed NH_3 inversion spectra from the Green Bank Ammonia Survey. We compare the results of our model to the single-component fits of Friesen et al. (2017) to determine whether assuming a single velocity component biases model parameter estimates. We find that the resulting gas property distributions are very similar between the one- and two-component models. The two-component model does, however, show a peak in velocity dispersion near the thermal sound speed not seen in the one-component results, indicative of non-turbulent, thermal gas. Maps of the velocity dispersion show that regions of transonic gas correspond to denser regions of Orion A that are likely to be star-forming. The excess of gas near the sonic speed in dense regions over previous analyses suggests a greater quantity of gas unstable to gravitational collapse in Orion A.

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