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Fitting Methods for Column Density PDFs of Turbulent Star-forming Clouds AVERY KIIHNE, SABRINA APPEL, BLAKELSEY BURKHART, Rutgers University, New Brunswick — Density probability distribution functions (PDFs) are used as analytic tools for studying star formation. The PDF of star forming regions takes on a lognormal form at low density with transition to a power law form at high density. The power law form indicates where self-gravity becomes dominant over supportive motions in the cloud, and understanding how the slope of the tail and the transition density depends on environment is of interest to observers and theorists alike. We study column density PDFs for a suite of four 3D hydrodynamical simulations of star forming regions of molecular clouds. These simulations include different physical processes, starting with just self-gravity and adding turbulence, magnetic fields, and protostellar outflows. We fit an analytic form to the simulated column density PDFs in order to compare to analytic models. We demonstrate a novel fitting method using spline to fit the curve of the column density and measure the width of the lognormal, the slope of the power law tail, and the transition column density between lognormal and power law portions of the PDF. We find agreement between this method and two other more traditional least squares fitting methods. Future research will be conducted to apply our results to observation.

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