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The Effects of Magnetic Fields and Outflow Feedback on the Shape and Evolution of the Density PDF in Turbulent Star-Forming Clouds SABRINA APPEL, BLAKESLEY BURKHART, Rutgers, the State University of New Jersey, VADIM SEMENOV, Center for Astrophysics, Harvard Smithsonian, CHRISTOPH FEDERRATH, Research School of Astronomy and Astrophysics, The Australian National University, ANNA ROSEN, Center for Astrophysics, Harvard Smithsonian — In this talk, I will describe how we use a suite of 3D hydrodynamical simulations of star-forming molecular clouds to investigate how the density probability distribution function (PDF) changes when including gravity, turbulence, magnetic fields, and protostellar outflows and heating. We find that the density PDF is not lognormal when outflows and self-gravity are considered. Self-gravity produces a power-law tail at high densities and the inclusion of stellar feedback from protostellar outflows and heating produces significant time-varying deviations from a lognormal distribution at the low densities. The simulation with outflows has an excess of diffuse gas compared to the simulations without outflows and maintains a slower star formation rate over the entire duration of the run. We study the mass transfer between the diffuse gas in the lognormal peak of the PDF, the collapsing gas in the power-law tail, and the stars. We find that the mass fraction in the power-law tail is constant, such that the stars form out of the power-law gas at the same rate at which the gas from the lognormal part replenishes the power-law. We find that turbulence does not provide significant support in the dense gas associated with the power-law tail.

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