Effects of Clusters on their Constituent Solar Systems and Possible Constraints on the Birth Environment of the Sun

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Most stars -- and most solar systems -- form within groups and clusters. One objective of this work is to explore how these star forming environments affect the solar systems forming within them via three channels: dynamical interactions, elevated radiation fields, and increased particle fluxes. The discussion starts with the dynamical simulations, which are used to study how cluster evolution depends on system size and initial conditions. Multiple realizations of equivalent cases are used to build up a statistical description of these systems, e.g., distributions of closest approaches and radial locations. These results provide a framework from which to assess the effects of clusters on solar system formation. Distributions of radial positions are used in conjunction with UV luminosity distributions to estimate the radiation exposure of circumstellar disks. Photoevaporation models determine the efficacy of radiation in removing disk gas and compromising planet formation. The distributions of closest approaches are used in conjunction with scattering cross sections to determine probabilities for solar system disruption. Finally, we determine the distributions of radioactive nuclei that are provided to circumstellar disks, where they enhance ionization and heating. This work provides a quantitative determination of the effects of clusters on forming solar systems. In the second part of the talk, these results are used to place constraints on the possible birth environments for our own solar system.