DISK DISPERSAL AND THE FORMATION OF PLANETARY SYSTEMS

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Gas-rich dust disks around young stars (hereafter, protoplanetary disks) provide the raw material to build up planets. Thus, the time scale over which they disperse and the physical mechanisms contributing to their dispersal are key in understanding what type of planets can form and on what timescale. Significant progress has been made in the past few years in measuring the dispersal timescale of protoplanetary disks. Surveys of nearby star-forming regions and associations have established that by age 10 Myr only a few percent of pre-main sequence sun-like stars still retain a gas-rich dust disk [1,2,3]. Still much debate exists on the disk dispersal mechanisms and on their efficiency.

In this talk, I will discuss the theoretical mechanisms proposed to explain the dispersal of protoplanetary disks with special emphasis on viscous accretion, planet formation, and star-driven photoevaporation. I will seek constraints from observations of protoplanetary disks and from the Solar System to evaluate the role of these mechanisms in dispersing primordial gas and dust. I will also present newly discovered gas lines that can be used to trace star-driven photoevaporative flows and discuss how to measure the rate at which disks lose their mass via photoevaporation [4,5,6]. Finally, I will show how these disk dispersal mechanisms impact the final architecture of planetary systems.

References: [1] Pascucci, I. et al. 2006. *Astrophysical Journal* 651:1177. [2] Hernandez, J. et al. 2008. *Astrophysical Journal* 686:1195. [3] Pascucci, I. & Tachibana, S. 2010 in Protoplanetary Dust: Astrophysical and Cosmochemical Perspectives. Eds: D. Apai & D. Lauretta, Cambridge University Press, p.263-298. [4] Pascucci, I. & Sterzik, M. 2009. *Astrophysical Journal* 702:724. [5] Pascucci, I. et al. 2011. *Astrophysical Journal* in press (arXiv:1105.0045). [6] Sacco, G., Flaccomio, E., Pascucci, I. et al. in prep.