Radial mixing of planetesimals during different phases of Solar System formation

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A number of studies in recent years have shown that the 'classical', in-situ model of planet formation fails to reproduce the Solar System. Rather, other processes such as radial drift and orbital migration are needed. I will review the latest ideas about the Solar System's formation, with an emphasis on how they affect the distribution of planetesimals. Several steps in Solar System formation produce large-scale radial mixing: 1) orbital migration of giant planet cores, which may have been inward or outward; 2) gas accretion onto the giant planets; 3) orbital migration of the giant planets; 4) long-term collisional and dynamical sweepup of asteroids/comets; and 5) a "Nice model" instability in the giant planets' orbits. I will discuss these processes and how they constrain the formation location of asteroids and comets.