Mercury, the Impactor: Fate of Projectiles Emerging From Hit-and-Run Events in the Inner Solar System.

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Late stages of planet formation, in regions closer to the Sun, were characterized by a vigorous dynamical environment that was conducive to giant impacts among planetary embryos. These lead to diverse outcomes (partial accretion/erosion, grazing, disruption) and depend on the the specific system parameters. Most probably such events were “hit and run” collisions (small mass ratios and off-axis oblique impacts), which have been invoked to explain outstanding issues, such as volatile loss records among the planets and the origin of the Moon.

Mercury, the smallest and most peculiar planet, still poses an open question regarding its origin and how it relates to terrestrial planet formation. Having proto-Mercury be the disrupted projectile in a giant impact explains most of its metal/silicate enrichment (iron core remains bound while most of the silicate mantle is ejected) and volatile budget (net depletion due to devolatilized fragment re-accretion).

In the context of large planetary formation simulations, velocity and impact angle distributions are necessary to asses impact probabilities. The mass distribution and interaction within planetary embryo swarms depends both on gravitational dynamics and the applied fragmentation mechanism. We will present results pertaining to the curious origin of Mercury and general projectile remnant scaling relations.