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# Investigating the outcomes of SPH models of catastrophic destruction

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**Abstract.**

Smooth particle hydro-dynamics (SPH) codes have proved able to simulate satisfactorily the shattering processes in high-energy collisions among asteroids, reproducing the major observational evidences. In particular, SPH models reproduce fairly well the size distributions of the members of some asteroid families. A considerable difference between SPH models and Semi-Empirical Models (SEM) is that in the former the asteroids are ground up into very small fragments, the size of which is limited by the resolution of the code. Moreover, the subsequent ballistic dynamical evolution, driven by their mutual gravitational attraction, would result in a significant re-accumulation into many bodies.

On the contrary, ejection velocity fields predicted by SEM allow the reaccumulation into very few bodies, sometimes only the largest remnant. This difference is a critical issue for the interpretation of the observational data in order to understand the physics of the catastrophic destruction process, and the physical characteristics of the asteroids themselves.

We present a new analysis of some SPH velocity fields aiming to shed light on the intrinsic differences between SPH models and SEMs.