MAR05-2005-020203

Abstract for an Invited Paper
for the MAR05 Meeting of
the American Physical Society

Simulations of impact cratering in granular media

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We simulate impact cratering in two dimensions using soft particle molecular dynamics simulations. We systematically vary the physical parameters of the grains and the ball (density, size, friction, impact energy). Our results confirm the recently observed scaling of the crater depth with impact energy as observed by Uehara et al and the effect of constant deceleration of the ball during the penetration phase as observed by Pica Ciamarra et al. We focus on the distribution of energy dissipation during the impact among various dissipation mechanisms and conclude that the most significant dissipation occurs due to internal frictional contacts among the grains.