

## Experimental study for effect of centrifugal force on collisional disruption: comparison with experiment under microgravity

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Recent observation revealed that many asteroids rotate sufficiently rapid near the rotational stability limit. It is inferred that the centrifugal force in spinning asteroid affects the conditions on collisional fragmentation. In order to investigate this effect, it is necessary to perform impact experiments of rotating targets. However, impact experiments with rotating targets hardly have been performed because it is difficult to keep the stability of the rotating samples. We have performed two series of impact experiments. In impact experiments of stress-applied targets, impact experiments were conducted for stress-applied cylindrical targets in order to examine the effect of the tensile stress in the target due to the centrifugal force. In impact experiments of rotating targets, we performed impact experiments of rotating low-strength targets. The degree of disruption of targets increases when the internal stress is as little as 10 % of the target tensile strength. This result suggests that the rotation has strong effect in disruption threshold. In this study, we performed impact experiments with rotating porous targets under microgravity.

Impact experiments were performed in airplane under microgravity about  $10^{-2}$  G generated by parabolic flight, using commercial airsoft gun. Projectiles were plastic spheres of 6 mm in diameter, and impact velocity was about 80 m/s. Targets were sintered 50-micron glass beads and the shape was cylinder of 24 mm in diameter and 25 mm in length. Impact experiments were performed while the target was spun up to 500 rpm by the DC motor. A high-speed video camera running at 600 fps recorded the events.

The largest fragment mass normalized by the initial target mass ( $M_L/M_0$ ) decreases with increasing spin rate. This tendency is inconsistent with that of the impact experiment under normal gravity, because in this experiment  $M_L/M_0$  hardly changed whether the targets spun or not. We will discuss on comparison with the experimental results of other kinds of samples.

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