

## Tracking and Motion Analysis of Impact Fragments

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In the solar system, hypervelocity impacts and destruction of small bodies frequently occur. To understand the physics of collisional destruction, the phenomena are reproduced by laboratory experiments in the research field of the planetary sciences. A situation of destruction is taken by a high-speed video camera, and size and velocity of fragments which are estimated. Human operators used to measure motions of fragments in the movie frames manually. In this research, we strived for the automation of the movement analysis of the fragments.

Some preprocessings are given to images cut out from an experiment movie, and automatic tracking that applied continuous dynamic programming (CDP) was done to comparatively

large fragments, and the monotonous contiguity was guaranteed when backtracing after CDP was applied. Moreover, reference images in the tracking were made automatically. In addition, I analyzed the velocities and areas of the fragments, and confirmed that the technique was effective.