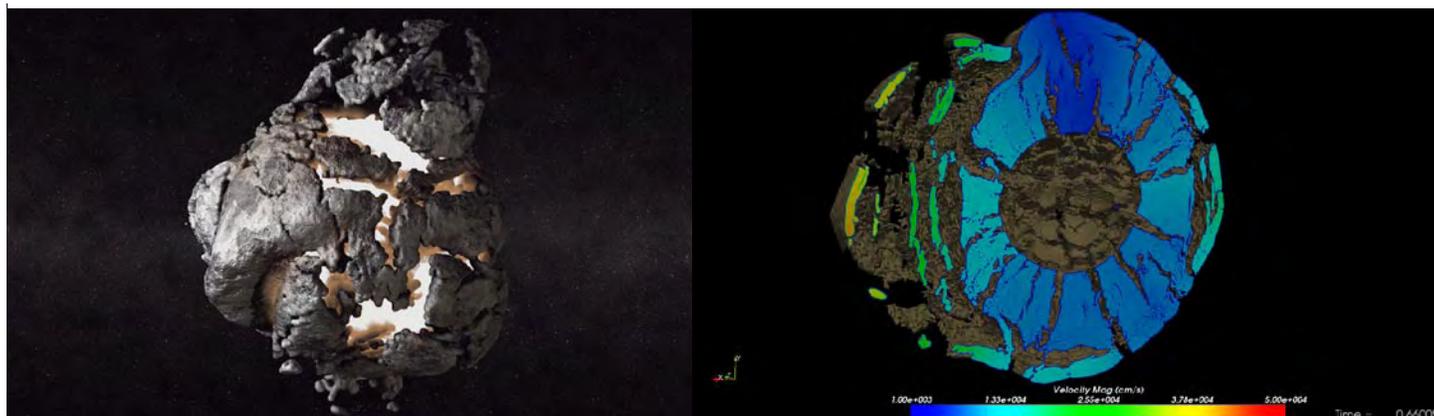# Computational and Information Sciences
Red Storm

Experimental rendering, using simulation geometry, of destruction of Asteroid Golveka by 10-megaton explosion. This is an actual simulation, not an animation or drawing.

Red Storm evaluates strategies to protect the Earth from a cosmic impact

High-resolution simulations increase usefulness of data.

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Sandia researchers are using the labs' Red Storm massively parallel computing capabilities to examine deflection and disruption as two strategies for preventing a large impact of an asteroid with Earth. Deflection keeps the asteroid in one piece and changes its trajectory to miss Earth. Disruption fragments and disperses the asteroid so that all the large pieces miss Earth.

We selected asteroid Golevka, which is about a half kilometer in diameter, to simulate an extreme deflection. In our highest-resolution CTH shock-physics simulation, we initiated a 10-megaton explosion at the center of mass. Red Storm ran the simulation for about 15 hours and provided about 0.65 seconds of simulated time. The remarkable resolution of this simulation – 1 meter, with a 1 cubic kilometer mesh that contained a billion cells – provides realism in crack formation and propagation not seen in lower-resolution models.

Asteroid Golevka is the most extreme case in a series of simulations to assess the defensive use of large explosions on Earth-crossing asteroids. This case does not represent a realistic option, but provides useful insight when compared to other cases.

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