

Balloon Burst

Real-Time Live!

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The first demonstration of a large-scale physical simulation of the interaction among water, a thin elastic surface, and a rope in real time. The simulation allows the user to look at and interact with the bursting water balloon through a 4000fps high-speed camera. The target location of the bullet can be chosen with the mouse. The user can also manipulate the camera and switch to “bullet time” mode, in which the simulation is slowed down to 1/8 of the frame rate.

The objects in the scene are represented by 250,000 particles and simulated using the NVIDIA unified solver Flex. An additional set of 512,000 diffuse particles is added as spray and small droplets. The balloon is modeled with a cloth mesh of particles linked with distance constraints, while the water particles are simulated with a position-based fluid method. The bullet is represented by particles grouped with a shape-matching constraint. The demonstration shows results for three different bullet-hit locations, which cause dramatically different balloon explosions and water splashes.