

## Results from NASA's Deep Impact Mission to Comet Tempel 1

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### Abstract:

In the early hours of July 4, 2005, one of the two of NASA's Deep Impact spacecraft splashed down on the surface of Comet Tempel 1 at 10.2 km/sec, creating an impact crater about 100 m in diameter and 30 m deep. The second spacecraft, passing by at the safe distance of 500 km, sent images of the event back to the Earth. The object of this interplanetary kamikaze mission was to dig deep beneath the surface dust deposits and expose the pristine interior 1 to 10 m below the surface. The mission succeeded spectacularly: The impact threw out about 10 million kilograms of fine dust, tarry organic material, frozen water and CO<sub>2</sub>, after creating an initial jet of melted silicates and vaporized ices. Analysis of more than 4,000 images and spectra returned from the two spacecraft, revealed that old ideas about the structure of comets must be substantially revised. On November 4 of this year, the Deep Impact team is returning to Tempel 1 via the Stardust spacecraft to examine the consequences of the impact in more detail and complete our survey of the comet's surface.

### Melosh Brief Bio:

H. J. Melosh is a Distinguished Professor of Earth and Atmospheric Science at Purdue University in West Lafayette, IN. He received an AB degree in Physics from Princeton University in 1969 and a PhD in Physics and Geology from Caltech in 1973. His principal research interests are impact cratering, planetary tectonics, and the physics of earthquakes and landslides. His recent research includes studies of the giant impact origin of the moon, the K/T impact that extinguished the dinosaurs, the ejection of rocks from their parent bodies and the origin and transfer of life between the planets. He is a science team member of NASA's Deep Impact mission that successfully cratered comet Tempel 1 on July 4, 2005.

Professor Melosh is a Fellow of the Meteoritical Society, the Geological Society of America, the American Geophysical Union, and the American Association for the Advancement of Science. He was awarded the Barringer Medal of the Meteoritical Society in 1999, the Gilbert prize of the Geological Society of America in 2001, and the Hess Medal of the American Geophysical Union in 2008. He was a Guggenheim Fellow in 1996–1997 and a Humboldt Fellow at the Bavarian Geological Institute in Bayreuth, Germany, in 2005–2006. Asteroid #8216 was named “Melosh” in his honor. He was elected to the U.S. National Academy of Sciences in 2003.

He has published approximately 170 technical papers, edited two books, and is the author of a major monograph, *Impact Cratering: A Geologic Process*. He is currently preparing a new book “Planetary Surface Processes” under contract to Cambridge University Press.