

SEISMIC PROBING OF AN ASTEROID USING ONE SOURCE AND ONE RECEIVER. Yuan Tian¹ and Yingcai Zheng², ¹Department of Earth and Atmospheric Sciences, University of Houston, Houston, TX, (ytian@central.uh.edu) ²Department of Earth and Atmospheric Sciences, University of Houston, Houston, TX, (yzheng24@central.uh.edu)

Introduction: The interior composition of the asteroid is important to understand its origin and evolution. If a seismic source is detonated and a receiver listens the asteroid surface vibration, we can deduce important information about the interior.

Method: One salient feature about the asteroid is the highly irregular body geometry. To study seismic wave propagation and scattering in an asteroid, we need to be able to handle the topography. We have created a 3D Boundary Element Method (BEM) [1] for this purpose. Our BEM code has been benchmarked with the analytical solution for an ideal sphere. For some asteroid, the topography is usually accurately mapped. With one seismic source and one receiver and by doing the modeling with the topography to fit the recorded seismogram, we can get a quick assessment about the average velocity and density for the asteroid. To test our procedure, we have done numerical modeling experiments to demonstrate the work under the influence of the large topography.

References: [1] Zheng Y., Malallah A.H., Fehler M.C., Hu H. (2016), *Geophysics*, 81, T25.