1106-86-1997 **James D. Walker*** (james.walker@swri.org), 6220 Culebra Road, San Antonio, TX 78238, and **Sidney Chocron**, **Rory P. Bigger** and **Trent Kirchdoerfer**. *Asteroid seismology: using natural frequencies distribution to infer internal structure.*

Our solar system is full of small bodies in the form of asteroids and comet nuclei. Seismology is the only mechanism we currently have for looking at the interior of these objects to provide clues as to structure and origin. Seismology has been very successful in exploring the interior structure of the Earth, but for small bodies at remote locations in the solar system we are heavily constrained by the number of seismic sources and measuring devices, probably only 2 to 3 for each for a space mission. One approach to utilizing the limited instrumentation is to study the full body vibrations or spectrum. Asteroids and comet nuclei have varied outer shapes, as well as the possibility of interior structure ranging from rubble piles to large monolithic pieces. Eigenvalue distributions are affected by both exterior shape and interior structure. We display the natural frequency (eigenvalue) distribution for a sphere, an ellipsoid, and from computations assuming the outer surface shape of asteroid Itokawa, where a detailed surface map exists due to the Japanese Hayabusa mission. The distributions show qualitative behavior relating to both outer shape and interior structure. This work is in support of efforts to include a seismology experiment on a space mission to an asteroid. (Received September 15, 2014)