Abstract Submitted
for the SHOCK15 Meeting of
The American Physical Society

Birch's Law for high-pressure metals and ionic solids: Sound velocity data comparison between shock wave experiments and recent diamond anvil cell experiments DAVID BONESS, LUCAS WARE, Physics Department, Seattle University — Sound velocity-density systematics has long been a fruitful way to take shock wave measurements on elements, alloys, oxides, rocks, and other materials, and allow reasonable extrapolation to densities found deep in the Earth. Recent detection of super-Earths has expanded interest in terrestrial planetary interiors to an even greater range of materials and pressures. Recent published DAC experimental measurements of sound velocities in iron and iron alloys, relevant to planetary cores, are inconsistent with each other with regard to the validity of Birch's Law, a linear relation between sound velocity and density. We examine the range of validity of Birch's Law for several shocked metallic elements, including iron, and shocked ionic solids and make comparisons to the recent DAC data.

David Boness
Seattle University

Date submitted: 30 Jan 2015 Electronic form version 1.4