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Post-shock Temperature and Free Surface Velocity Measurements of Basalt GREGORY KENNEDY, SARAH STEWART, LAUREL SENFT, Harvard University, MICHAEL FURLANETTO, ANDY OBST, JEREMY PAYTON, ACHIM SEIFTER, Los Alamos National Laboratory — Basalt is the most common rock on planetary surfaces. Post-shock temperature and particle velocity measurements provide fundamental information about the effects of impact cratering events on planets, the outcome of collisions between small bodies, and the thermal history of meteorites. A high-speed infrared four-wavelength pyrometer, developed at Los Alamos National Laboratory, is used with customized front end optics at the Harvard Shock Compression Laboratory for concurrent observations of particle velocity (VISAR) and free surface emission from Columbia River flood basalt. Preliminary data at a peak shock pressure of 29 GPa indicate that the free surface includes hot spots, likely due to sub-mm void spaces, within the ∼4-mm diameter area of the pyrometry observations. The two long wavelength (3.5 and 4.8 micron) channels record a post-shock temperature between 585 and 610 K, slightly higher than the CTH basalt EOS model. The two short wavelength (1.8 and 2.3 micron) channels record hot spot temperatures >700 K. Free surface velocity measurements are lower than predicted by the basalt EOS model. Improvements to the basalt EOS using particle and post-shock temperature data will be discussed.

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