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Shock-and-Release to the Liquid-Vapor Phase Boundary: Experiments and Applications to Planetary Science

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Shock-induced vaporization was a common process during the end stages of terrestrial planet formation and transient features in extra-solar systems are attributed to recent giant impacts. At the Sandia Z Machine, my collaborators and I are conducting experiments to study the shock Hugoniot and release to the liquid-vapor phase boundary of major minerals in rocky planets. Current work on forsterite, enstatite and bronzite and previous results on silica, iron and periclase demonstrate that shock-induced vaporization played a larger role during planet formation than previously thought. I will provide an overview of the experimental results and describe how the data have changed our views of planetary impact events in our solar system and beyond.

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