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Shock states of solid Mg_2SiO_4 JOSHUA TOWNSEND, LUKE SHULENBURGER, Sandia National Laboratories — To date there have been thousands of planets discovered outside our solar system. Forsterite, the magnesium end-member of olivine, ($(Mg,Fe)_2SiO_4$) is abundant in the Earth's mantle, and is likely a common planetary building block throughout the galaxy. Despite extensive investigation under terrestrial pressure and temperature regimes, the behavior of the Mg_2SiO_4 system at higher pressures and temperatures (P>100 GPa, T>4000 K) remains poorly understood. To better understand the behavior of planetary impact processes and the structure of massive planets we investigated the high pressure and high temperature properties of Mg_2SiO_4 using combined shock compression experiments on the Z-machine at Sandia National Laboratories, and *ab-initio* molecular dynamics simulations. We compare our results to other recent experiments on shocked forsterite. Sandia National Laboratories is a multi-program laboratory managed and operated by Sandia Corporation, a wholly owned subsidiary of Lockheed Martin Corporation, for the U.S. Department of Energy's National Nuclear Security Administration under Contract No. DE-AC04-94AL85000. SAND2017-1987 C.

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