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Ultra-High-Pressure Water MARTIN FRENCH, RONALD REDMER, Universitat Rostock, Institut fur Physik, D-18051 Rostock, Germany, THOMAS R. MATTSSON, Sandia National Laboratories, Albuquerque, NM 87185-1186, USA.
— We present the first all-electron QMD simulations of water in the ultra-high-pressure regime up to conditions typical for the deep interior of Jupiter and Saturn. We calculate the equation of state and the Hugoniot curve and study the structural properties via pair correlation functions and self-diffusion coefficients. In the ultra-dense superionic phase, we find a continuous transition in the protonic structure. Water at conditions of Jupiter's core (i.e. 20000 K, 50 Mbar, 11 g/cm^3) forms a fluid dense plasma. Supported by the DFG within SFB 652. Sandia is a multiprogram laboratory operated by Sandia Corporation, a Lockheed Martin Company, for the United States DOE's National Nuclear Security Administration under contract DE-AC04-94AL85000.

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