

Abstract Submitted  
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**On the Possibility of Metastable Metallic Hydrogen** JEFFREY MCMAHON, Department of Physics and Astronomy, Washington State University — Metallic hydrogen, high- and room-temperature superconductivity, and controlled nuclear fusion have been singled out as the top three problems in physics. All of these involve hydrogen or its isotopes. Solid metallic hydrogen has recently been created in the laboratory at high pressure. Some of the key questions now concern whether this phase will be metastable at lower (and ambient) pressures, and, if so, what its properties are. In this presentation, the theoretical possibility of metastable metallic hydrogen will be discussed. Recent results from quantum Monte Carlo and density-functional theory calculations will be presented. These include the suitability of the latter for studying metallic hydrogen, the zero-temperature (ground- and metastable-state) phase diagram of the atomic (metallic) phase, the dynamical stabilities of the lattices, and, if there is time, their superconducting properties.

Jeffrey McMahon  
Department of Physics and Astronomy, Washington State University

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