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**Wide-Range Equation of State for Ablation Studies of Titanium**

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— An equation of state (EOS) for Ti was constructed using electronic structure calculations, based on the plane-wave pseudopotential method for condensed phases and the atom-in-jellium method in other states. The EOS was adjusted to match the observed STP state using a pressure correction which extrapolates correctly to zero density. The predicted principal shock Hugoniot was in good agreement with impact-induced shock measurements. The EOS was used to simulate ablative loading experiments on rolled foils of Ti at the TRIDENT. Laser ablation generated states in the warm dense matter regime. The measured free surface velocity histories exhibited multiple wave structures indicative of plastic flow and the alpha-omega phase transition. Estimates of the flow stress and the phase transition pressure on nanosecond time scales were obtained.

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