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Large scale MD Simulations of the time-resolved optical properties of warm dense metals S. MAZEVET, J. CLEROUIN, L. SOULARD, Département de Physique Théorique et Appliquée, CEA/DAM Île-de-France/BP12, 91680 Bruyères-le-Châtel Cedex, France — Recent experiments on gold suggest that the electrical and optical properties of metals in the warm dense matter regime can be accessed by performing time-resolved measurements after the illumination of a metallic thin film by a short-pulse laser[1]. The non-equilibrium situation created in this experimental setup poses new challenges to simulation methods as the time evolution of the atomic structure needs to be followed as the metal evolves from a solid to a plasma state. We used a combination of *ab-initio* and large scale molecular dynamics simulations to calculate the evolution of the atomic structure, and the electrical conductivity of various metals during the first pico-seconds after a short-pulse laser illumination.

[1] K. Widmann, T. Ao, M.E. Foord, D.F. Price, A.D. Ellis, P.T. Springer, and A. Ng, Phys. Rev. Lett. **92**, 125002 (2004).

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