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Electron conductivity in warm and hot dense matter CHARLES STARRETT, MARC CHAREST, DAVID FEINBLUM, DANIEL BURRILL, Los Alamos Natl Lab — The electronic conductivity of warm and hot dense matter is investigated by combining the Ziman-Evans approach with the recently developed pseudo-atom molecular dynamics (PAMD) method. PAMD gives an accurate description of the electronic and ionic structure of the plasma. The Ziman-Evans approach to conductivity, which takes the electronic and ionic structures as inputs, has been widely used but with numerous different assumptions on these inputs. Here we present a systematic study of these assumptions by comparing results to gold-standard QMD results that are thought to be accurate but are very expensive to produce. The study reveals that some assumptions yield very inaccurate results and should not be used, while others give consistently reasonable results. Finally, we show that the Thomas-Fermi version of PAMD can also be used to give accurate conductivities very rapidly, taking a few minutes per point on a single processor.

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