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Modifying the Random Phase Approximation for the Average Atom[1] THOMAS HENTSCHEL, Cornell University, STEPHANIE HANSEN, ATTILA CANGI, ANDREW BACZEWSKI, Sandia National Laboratories — The dielectric function corresponding to the Random Phase Approximation (RPA) has been applied in many studies to determine the response properties of plasmas like dynamic structure factors and stopping powers. However, the RPA fails to take into account short range electron-electron and electron-ion interactions. These interactions can be calculated by average-atom models and used to modify the RPA dielectric function to obtain self-consistent response properties. We show how the modified dielectric function changes both dynamic structure factors and stopping powers for charged particles traveling through a plasma and compare with results in the literature.

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