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[Lecture]

Quantum calculation of the optical properties of dense plasma

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Abstract:

A problem of describing a optical properties of dense plasma arises from the inconsistency of the application of the models for plasma of moderate or extreme densities onto high density plasma. Although it is not of extreme interest in laser confined fusion, the interest of plasma of moderate and high density is of high importance in Solar and stellar plasma, especially in photosphere region. From the reason of applicability, the steps for inclusion of complex ions are made. Since the moderate density plasma models are not capable to describe a strong collective phenomena in dense plasma, and since commonly used molecular dynamic coupled with Schrodinger solver is computing power hungry and in case of moderate density plasma they must use a much bigger ansamble of particles with enlarged calculation error. Here a retrospective of approach in fully quantum model is presented. The relatively simple model is capable of describing a emitter in dense plasma. Here the focus would be both on model potential as well as ideas for further development of used model. The further steps could bring a more accurate and widely

applicable model that could help in research of both theoretical as well as experimental research of dense plasma.

Keywords: dense plasma, optical properties, Schrodinger equation, model potential

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