

# Opacity Model with Self-Consistent Plasma Effect

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In warm and hot dense matter, the high density and elevated temperature introduce non-perturbative plasma effects into the electronic structure. These effects influence the measured opacity in complicated ways, and are hard to model. Techniques, like diagnosis of plasma conditions from line shapes, and the modeling of physical systems like stars, require an ability to accurately predict the opacity of these dense plasmas. We have developed a variational model that includes plasma effects in a self-consistent way. It does this in part by including all electrons, bound and free, and not making a hard distinction between them [1,2]. We present calculations of the opacity in dense conditions relevant to the solar interior. Comparisons with a state-of-the-art traditional approach reveal some important differences.

## References

- [1] C. E. Starrett, T. Q. Thelen, C. J. Fontes and D. A. Rehn, Phys. Rev. E **109**, 035201 (2024).
- [1] T. Q. Thelen, D. A. Rehn, C. J. Fontes and C. E. Starrett, Phys. Rev. E **110**, 015207 (2024).

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