Abstract Submitted
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An improved algorithm for solving Collisional Radiative Equilibrium (CRE) equations[1] MARCEL KLAPISCH, MICHEL BUSQUET, ARTEP, Inc. — Elements used in ICF target designs can have many charge states in the same plasma conditions, each charge state having numerous energy levels. When LTE conditions are not met, one has to solve CRE equations for the populations of energy levels, which are necessary for opacities/emissivities, Z* etc. Although successful statistical methods have been devised[1], these are insufficient in case of sparse spectra, or when configuration interaction is important (open d or f shells). For these cases the HULLAC code[2] can be used to generate transition rates. The equations to be solved may involve tens of thousands of levels. Moreover, the system is by nature ill conditioned. In this poster, we present a powerful, quick and robust CRE equation solver. We factor the level populations in ion population times level reduced population. The algorithm consists of double Newton –Raphson iterations. Results will be shown on Carbon and Xenon.

[1] A Bar-Shalom, J Oreg, and M Klapisch, J. Q. S. R. T.,65, 43 (2000).
[2] A Bar-Shalom, J Oreg, and M Klapisch, J. Q. S. R. T.,71, 169 (2001).

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