

Abstract Submitted
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R-Matrix calculations for Improved Atomic Data for Astrophysical Opacities and Plasma Effects¹ ANIL PRADHAN, SULTANA NAHAR, Te Ohio State University — A review of a renewed effort to recalculate astrophysical opacities using the R-Matrix method is presented [1]. The computational methods and new extensions are described. Resulting enhancements found in test calculations under stellar interior conditions compared to the Opacity Project could potentially lead to the resolution of the solar abundances problem, as well as discrepancies between recent experimental measurements of iron opacity at the Sandia Z-pinch inertial confinement fusion device and theoretical opacity models. Outstanding issues also discussed are: (i) accuracy, convergence, and completeness of atomic calculations, (ii) improvements in the Equation-of-State of high-temperature-density plasmas, and (iii) redistribution of resonant oscillator strength in the bound-free continuum, and (iv) plasma broadening of autoionizing resonances. Results are reported for Fe XVII and other Fe ions. This work is supported by the National Science Foundation and the Department of Energy. The computational work is carried out at the Ohio Supercomputer Center. [1] S.N. Nahar and A.K. Pradhan, Phys. Rev. Letts., 116, 235003, 2016.

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