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Iron opacity experiments for the solar interior[1] T. NAGAYAMA, J.E. BAILEY, G. LOISEL, G.A. ROCHAU, S.B. HANSEN, Sandia National Laboratories, C. BLANCARD, PH. COSSE, G. FAUSSURIER, F. GILLERON, J.-C. PAIN, CEA, A.K. PRADHAN, C. ORBAN, M. PINSONNEAULT, S.N. NAHAR, Ohio State University, Columbus, C.A. IGLESIAS, B. WILSON, Lawrence Livermore National Laboratories, Livermore, J. COLGAN, C. FONTES, D. KILCREASE, M. SHERRILL, Los Alamos National Laboratory, Los Alamos, J.J. MACFARLANE, I. GOLOVKIN, Prism Computational Sciences, Madison, R.C. MANCINI, University of Nevada, Reno — Iron opacity experiments near solar interior conditions are performed at SNL Z-machine to better constrain solar models. The SNL opacity science platform satisfies the many challenging requirements for opacity measurements and successfully determines iron opacities at multiple conditions. We found that the agreement between the modeled opacity and the measured opacity deteriorates as Te and ne are raised to approach solar interior conditions. While the inaccuracy of the modeled opacity partially resolves the solar abundance problem, the announcement of such discrepancies has a high impact on the astrophysics, atomic physics, and high energy density physics, and thus more scrutiny on the potential experimental flaws is critical. We report the synthetic investigation for potential sources of systematic uncertainties in the experiments.

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