Abstract Submitted
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THE IRON OPACITY PROJECT: High-Energy-Density Plasma Opacities[1] E. PALAY, C. ORBAN, S. NAHAR, A. PRADHAN, M. PINNSONOAULT, The Ohio State University, J. BAILEY, Sandia National Lab — Opacity governs radiation flow in plasma sources. Accurate opacities are needed to model unobservable laboratory and astrophysical conditions. High-energy-density (HED) plasma conditions prevalent in stellar interiors can now be recreated in the laboratory. The Z-pinch fusion device at the Sandia National Lab can reproduce temperatures and densities near the boundary where radiation transport changes from diffusion to convection inside the Sun. To benchmark theoretical opacities experiments are essential to resolve the outstanding discrepancy in solar abundances. The most common volatile elements C, N, O, Ne, etc. have been spectroscopically measured to be up to 50% lower than the standard abundances. This introduces conflict in the derived values of basic solar parameters such as the radiation/convection boundary, sound speed, and the primordial He abundance with precisely measured oscillations of the Sun through Helioseismology. A potential solution is increment of stellar opacities, which has inverse but complex relation with abundacnes, at least 30%. New iron opacity calculations include hitherto neglected atomic physics of fine structure and resonances which are largely treated as lines in existing opacities calculations. Preliminary results on radiative transitions in Ne

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