

Abstract Submitted
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The Iron Project & The Opacity Project: 1. Photoionization of Fe ions for Opacities, 2. P II transitions¹ SULTANA NAHAR, LIANSHUI ZHAO, Ohio State Univ - Columbus, WERNER EISSNER, Stuttgart University, ANIL PRADHAN, Ohio State Univ - Columbus — 1. Determination of accurate iron opacity at the boundary of the radiative and convection zones in the sun as been under considerable investigation as it will provide the information on elemental abundances in the sun and a test ground for both the theory and experiment. Opacity depends on the radiation absorption via photoionization and photo-excitations of the constituent ions in the plasmas. The on-going work for photoionization of Fe XVII and Fe XVIII, 2 of the 3 main contributors to iron opacity at the boundary, using large wavefunction expansions that include 218 levels for Fe XVII and 276 for Fe XVIII in close coupling approximation have been completed. The $\Delta n=1$ excitations in the core introduce huge resonant absorption in photoionization increasing the opacity significantly. This reduces the discrepancy between the predicted and expected opacities. The relevant features will be illustrated. 2. Phosphorus is a basic element of life and is abundant in the solar system. However, its presence in other astronomical objects has been undetectable until recently. JWST is expected to obtain high resolution infrared spectra of exoplanets. Predicted spectra of P II will be presented for possible detection by JWST

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