Abstract Submitted
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The Iron Project and the RMAX Project: Transitions in Fe XV, Fe XVI, and Astrophysical Applications[1] MAXIMILIANO MONTENEGRO, SULTANA NAHAR, ANIL PRADHAN, CHIRANJIB SUR, The Ohio State University, JUSTIN OELGOETZ, Los Alamos National Lab — While the Iron Project is involved in scattering and radiative atomic processes of iron and iron-peak elements, the Rmax Project aims at the X-ray spectroscopy of astrophysical objects. Under the Iron Project, the oscillator strengths and radiative decay rates for fine structure transitions going up to n=10 and l=9 are obtained for magenesium like Fe XV and sodium like Fe XVI. They correspond to 98 levels for Fe XVI and 504 levels for Fe XV. We have employed relativistic Breit-Pauli R-matrix method for the allowed electric dipole (E1) transitions and Breit-Pauli atomic structure calculations for forbidden (E2, E3, M1, M2) transitions for these ions. The results have been benchmarked against the ab initio coupled cluster method which includes relativistic effects. Very good agreement is found for Fe XVI. The application of the Iron Project and the RmaX Project data to laboratory and astrophysical sources is demonstrated for time-resolved spectroscopy of X-ray lines of He-like Fe and Ni, especially for the astrophysical diagnostic lines.

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