Abstract for ICAMDATA05, Meudon, France
October 15–19, 2006

M-shell dielectronic recombination and ionization of Fe ions

H. A. Sakaue,[1] I. Murakami,[1] D. Kato,[1] T. Kato,[1] N. Nakamura,[2] S. Ohtani,[2] U. I. Safronova,[3] Yu. Ralchenko[4]

[1] *National Institute for Fusion Science, Toki 509-5292, Japan*
[2] *The University of Electro-Communications, Chofu 182-8585, Japan*
[3] *University of Nevada, Reno, Nevada, USA*
[4] *National Institute of Standards and Technology, Gaithersburg, MD 20899, USA*

sakaue@nifs.ac.jp

Domain : Fusion, Astrophysics

M-shell dielectronic recombination and ionization of Fe ions are issues of study concerning EUV spectroscopy of solar corona by the Solar-B satellite [1] and impurity concentration of the Large Helical Device. Energy levels, radiative transition probabilities and autoionization rates for Mg-like and Na-like Fe ions were calculated by the Hartree-Fock-relativistic method (Cowan code) and the relativistic many-body perturbation theory method (RMBPT code) [2].

Experimental measurements of charge-state distribution of Fe ions in an Electron-Beam-Ion-Source/Trap (EBIS/T) is also being prepared. In the experiment, extracted ion intensities from the EBIS/T are measured by a magnet analyzer and a position-sensitive detector. Assuming the coronal equilibrium in the EBIS/T, the charge-state distribution is simulated by theoretical recombination and ionization cross sections. Comparison between the experiment and the simulation serves as validation of the theoretical cross sections. Resonant-Excitation-Double-Autoionization cross sections of Li-like I ions were measured by the similar method with the faith of theoretical cross sections for Radiative-Recombination, Direct-Ionization and Excitation-Autoionization [3].

Authors acknowledge with gratitude financial support from the Matsuo foundation.

[1] Solar-B project home page, http://solar-b.nao.ac.jp/index_e.shtml
[2] I. Murakami, T. Kato, D. Kato, U. I. Safronova, T. E. Cowan and Yu. Ralchenko, J. Phys. B 39, 2917 (2006).
[3] N. Nakamura, H. Tobiyama, H. Nohara, D. Kato, H. Watanabe, F. J. Currell and S. Ohtani, Phys. Rev. A 73, 020705(R) (2006).