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2s → np Autoionizing Resonances of the Neon Isoelectronic Sequence using RRPA and RMQDT NRISIMHA MURTY MADUGULA, MILIND V. RUNDHE, GOPALAN ARAVIND, PRANAWA C. DESHMUKH, IIT-Madras, STEVEN T. MANSON, Georgia State Unversity — Extensive theoretical and experimental studies of the photoionization of various atoms and ions have been carried out over long period of time [1, 2] owing both to the fundamental importance of the process and to the many applications, e.g., astrophysical and atmospheric modeling, plasma dynamics, etc. In the present work, we report our studies of the $2s \rightarrow np$ autoionizing resonances in the Ne isoelectronic sequence, of significance due to the cosmic abundance of these systems [2-4]. In particular, Ne, Na^{+}, Mg^{2+}, Al^{3+} and Sc^{11+} have been studied. The study has been performed within the framework of the relativistic random-phase approximation (RRPA) [5] and relativistic multichannel quantum defect theory (RMQDT) [6]. The resonances have been characterized in terms of position, width and shape, i.e., Fano profiles [7, 8], and the evolution of the parameters of the resonances along the sequence has been investigated.

[1] A. Neogi *et al*, Phys. Rev. A **67**, 042707 (2003). [2] H. S. Chakraborty *et al*, Phys. Rev. Lett. **83**, 2151 (1999). [3] H. S. Chakraborty *et al*, Ap. J. **595**, 1307 (2003). [4] G. Nasreen Haque, Ph.D. thesis (unpublished), Georgia State University, Atlanta, USA (1991). [5] W.R. Johnson et al, Phys. Scr. **21**, 409 (1980). [6] C. M. Lee and W.R. Johnson, Phys. Rev. A **22**, 979 (1980). [7] U. Fano and J. W. Cooper, Phys. Rev. A **40**, 441 (1968). [8] W.R. Johnson, et al, Phys. Rev. A **22**, 989 (1980).

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