

Abstract Submitted  
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**Inner-shell photodetachment of  $\text{Na}^-$  and electron-impact ionization of auto-ionizing states in  $\text{Na}$ .**<sup>1</sup> OLEG ZATSARINNY, KLAUS BARTSCHAT, Drake University, A.A. BOROVNIK, Institute of Electron Physics, Uzhgorod 88017, Ukraine — We have used the  $B$ -spline  $R$ -matrix (close-coupling) method with non-orthogonal sets of orbitals [1] to calculate inner-shell photodetachment of  $\text{Na}^-(3s^2)$  for incident photon energies between 30 and 50 eV. Satisfactory agreement is obtained with the measurements of Covington *et al.* [2]. With the same computational model for the e-Na (half) collision, we can also treat electron impact excitation of the  $(2p^5 3s^2)^2P_{3/1,1/2}$  autoionizing states in sodium. Our results for the latter process will be compared with new experimental data, obtained with an energy width (FWHM) of 200 – 250 meV in the incident beam [3]. This improvement in the energy resolution made it possible, for the first time, to resolve the near-threshold excitation of the two fine-structure components  $(2p^5 3s^2)^2P_{3/2,1/2}$  separately.

[1] O. Zatsarinny, *Comp. Phys. Commun.* **174** (2006) 273. [2] A.M. Covington *et al.*, *J. Phys. B* **34** (2001) L735. [3] A.A. Borovnik, O. Zatsarinny, and K. Bartschat; *Book of Abstracts ICPEAC XXV* (in press).

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