Inner-shell photodetachment of Na\(^-\) and electron-impact ionization of auto-ionizing states in Na.\(^1\) OLEG ZATSARINNY, KLAUS BARTSCHAT, Drake University, A.A. BOROVIK, 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 Na\(^-\)(3s\(^2\)) for incident photon energies between 30 and 50 eV. Satisfactory agreement is obtained with the measurements of Covington \textit{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\(^2\))\(^2\)P\(_{3/2,1/2}\) 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\(^2\))\(^2\)P\(_{3/2,1/2}\) separately.


\(^1\)Work supported by the NSF under PHY-0244470 and PHY-0555226, and by INTAS under 03-51-4706.