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The APAPES initiative and experimental determination of the $1s2s2p\ 4P/2P$ ratio produced in ion-atom collisions

Content :

An experimental beamline dedicated to atomic collisions physics research within the APAPES initiative at the 5 MV TANDEM “Demokritos” [1] accelerator in Athens, Greece has been constructed. A zero-degree Auger projectile spectroscopy apparatus composed of a single stage hemispherical spectrometer and a 2-dimensional position sensitive detector combined with a doubly-differentially pumped gas target has been assembled for high-resolution studies of electrons emitted in ion-atom collisions.

With this setup a systematic isoelectronic investigation of K-Auger spectra emitted from pre-excited ions in collisions with gas targets is planned. To date, new results include first 0 degree measurements from 12 MeV $C^{4+} + H_2$, He, Ne, Ar. Results combined with simulation data [2] will lead to a deeper understanding of the importance of cascade feeding [3,4] in collisions of $(1s2s\ 3S)$ pre-excited He-like ions with gas targets and elucidate their role in the non-statistical production of excited three-electron states by electron capture.

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