SOLID ANGLE CORRECTION FACTORS FOR HEMISPHERICAL AND TWO-STAGE PARALLEL PLATE ANALYZERS IN THE DETECTION OF LONG LIVED PROJECTILE AUGER STATES

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We present SIMION~8.1 Monte Carlo type simulations of the response function and detection solid angle of two analyzers: A hemispherical spectrograph with injection lens and position sensitive detector, and a two-stage parallel plate analyzer, both used in Auger projectile electron spectroscopy. Here the spectrometer lies in the direct path of the ion (and the electrons are measured at 0^o with respect to the beam direction) and the excited metastable projectile states (lifetimes ~1-10^3 ns) decay all along its path towards the spectrometer (and even inside the spectrometer). Thus, the overall electron detection solid angle varies with the position of electron emission resulting in a considerable correction to the measured electron yield. These effects, particular to Auger emission from fast moving projectile ions, are also included in our simulations. Our results are important for the accurate evaluation of the 1s2s2p $^4P/^2P$ ratio of K-Auger cross sections, whose observed non-statistical production by electron capture into He-like ions, recently a field of differing interpretations, awaits further resolution.