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Comment on "Coincidence studies of He ionized by C^{6+}, Au^{24+}, and Au^{53+}"

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In a recent article, McGovern *et al.* [Phys. Rev. A **81**, 042704 (2010)] suggested that the normalization of our measured fully differential cross section for ionization of helium by Au^{53+} needs to be checked. In this comment we confirm that the normalization of the published data is correct. Furthermore, we point out that, for a conclusive comparison between experiment and theory, an accurate inclusion of the experimental resolution using correct experimental parameters in the calculation is important.

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In a recent article of McGovern *et al.* [1], it was stated that "... the normalization of the experiment for Au^{53+} needs to be checked." We have done that and confirm our published values [2,3]. Indeed, the integral of our experimental fully differential cross sections (FDCS) over the projectile and electron solid angles and over electron energies up to 130 eV is identical to the same integral evaluated within the continuum distorted-wave eikonal-initial-state (CDW-EIS) model [2]. Furthermore, this integral is very similar to the total cross section given by McGovern *et al.* in Table I (contributions from energies larger than 130 eV to the total cross section are small).

We note that for $q = 0.65$ a.u. the 165-state coupled-pseudostate (CP) approximation actually does yield improved qualitative agreement with experiment for Au^{53+} impact, in that a structure in the cross sections near an electron ejection angle of zero degrees is found, in accord with the measured data. Nevertheless, large discrepancies remain for $Au^{24+,53+}$ impact and McGovern *et al.* are "inclined to suggest that it may not be theory that is at fault" [1]. In this context, they refer to Olson and Fiol [4], who "suggested that there may be extreme sensitivity to the temperature profile of the target gas jet" [1]. We agree with McGovern *et al.* (as well as with Olson and Fiol) that the experimental resolution has an effect on the shape of differential cross sections. However, the conclusions of Olson and Fiol are based on unrealistic assumptions regarding the temperature realized in the experiment, as we recently pointed out [3,5]. Conclusions regarding the effect of the temperature (or other parameters affecting the resolution) on the measured cross sections requires an accurate inclusion of the experimental resolution using correct experimental parameters in the calculation. This can be done within the so-called event generator method [3]. We would, therefore, be highly appreciative if McGovern *et al.* could provide us with such theoretical event files to consistently convolute the measured data with the experimental resolution, in particular the component originating from the target temperature of 2 K (not 16 K as assumed by Olson and Fiol [4]).

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