

Czasch *et al.* Reply: Using a simple classical model we discuss why only certain geometrical configurations of the highly double excited helium decay into a low energetic electron and a highly excited He^{1+} ion. Malegat [1] criticizes our model by stating that “it neglects the nonzero linear and angular momenta the particles have at the time considered and because it (the model) neglects the Coulomb interactions inside the system despite the fact that they are orders of magnitude larger than the perturbative coupling of the system to the photon field.”

In fact we indeed neglect the momenta of the electrons. We do this because—classically—the electrons move very slowly since they are in very high orbits and the binding energies are close to zero. In the situation that we describe in our model [see Fig. 3(c) in our Letter [2]] the remaining binding forces act perpendicular to the momenta which are selected from the initial state by the photoabsorption process. Therefore they do not perturb the propagation of the system along the saddle. We point out that this simple classical model was successfully applied to the situation slightly above the double ionization threshold [3] (see [4–6] for a more detailed discussion). Malegat uses the term “photon field.” However, in our model there is no relevant field of photons present (contrary, e.g., to the situation in a strong laser field). Instead we consider the absorption of one single photon. In our understanding the momenta of the particles are not “created” by the field, but rather selected from the Compton profile of the initial state upon photoabsorption. During the subsequent evolution of the system no photon field affects the movements of the particles.

Malegat states that our argument rests on the following ideas “. . . (i) if the system stays on the Wannier ridge $r_1 = r_2$, strong correlations develop, which is true; (ii) if strong correlations develop, the system will end with $\beta = -1$, which, despite current wisdom is false.” This is an incomplete summary of our model. We do not say “if strong correlations develop, the system will end with $\beta = -1$.” We rather describe which geometrical configurations lead to the observed angular distributions in conjunction with highly excited He^+ ions.

The fact that theoretical works predict a radically different angular distribution of the emitted electrons of $\beta = 2$ in the case of the $^3S^e$ helium (instead of $\beta = -1$ in the case of $^1S^e$) is indeed very interesting.

Our model predicts an angular distribution of $\beta = -1$ of the emitted electrons relative to the movement of the helium core rather than the polarization. We thus suggest to study the motion of the core for the $^3S^e$ helium case.

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