Comment on "Coulomb Explosion Patterns of Fast C_{60} Clusters in Solids"

Wang *et al.* [1] have recently calculated the patterns adopted by fast C_{60} ions moving through an aluminum target. A surprisingly new result is presented, which if true should have important applications in research and technological areas where high densities of energy deposition are needed. In short, these authors claim that, depending on the cluster velocity, the Coulomb explosion of such massive clusters is partially inhibited due to the wake forces induced in the stopping medium.

Putting aside the physical limitations of the model used by Wang *et al.* [1] (i.e., the validity of using the dielectric formalism and the neglecting of the multiple scattering), we have studied the same problem but using the energy loss function stated in Ref. [2]. Figure 1 shows the parallel and perpendicular components of the force exerted by a carbon ion on a neighbor one, which are smoother and much smaller than the ones depicted in Fig. 1 of Ref. [1]. We have reproduced essentially the same result using the plasmon pole approximation.

The consequences of these great differences in the interaction forces are better appreciated in Fig. 2, where the structure of a fast C_{60} ion is depicted as a function of the penetration time. We can appreciate how the geometry of the C_{60} ion becomes sizably larger than in Fig. 2 of Ref. [1]. These differences become more appreciable for longer times. In conclusion, there is not such an inhibition of the Coulomb explosion as Wang *et al.* claimed [1], and a strong enhancement in energy loss by fast cluster ions in solids should not be expected as due to this cause.

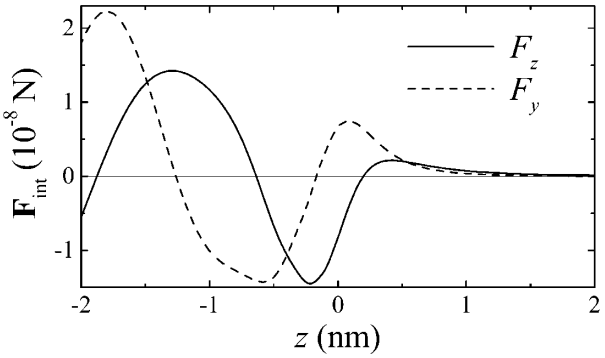

FIG. 1. Force exerted by a carbon ion on a neighbor one located at the relative position $x = y = 0.3$ nm. F_z and F_y are the components of the force parallel and perpendicular, respectively, to the direction of motion of the ion that exerts the force. The ions move through aluminum with a velocity $v = 4v_B$, where v_B is Bohr's velocity.

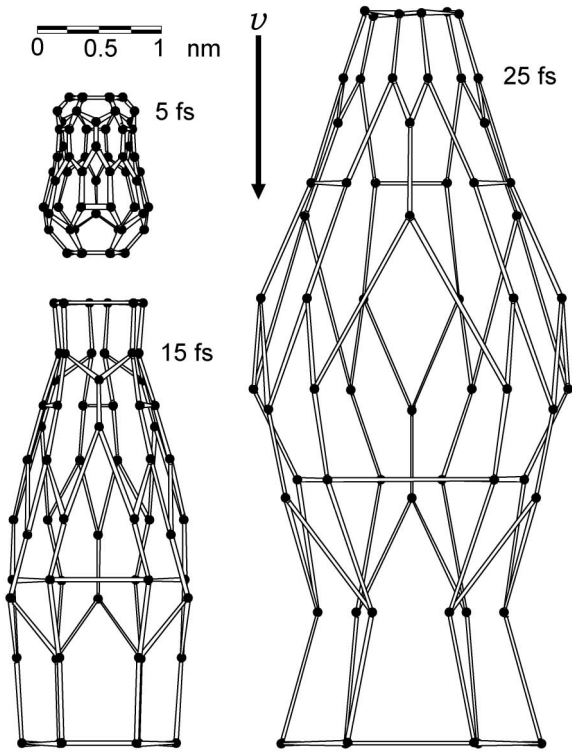

FIG. 2. Structure of the C_{60} molecular ion for three different times (5, 15, and 25 fs) of penetration in the aluminum target. The velocity of the ions is $v = 4v_B$.

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[1] Y.-N. Wang *et al.,* Phys. Rev. Lett. **85**, 1448 (2000).
[2] I. Abril *et al.,* Phys. Rev. A **58**, 357 (1998), with slight modifications in the fitting parameters, which preserve sum rules.

