

Abstract Submitted
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Formation of hollow atoms above a surface JEAN PIERRE BRIAND, Université P. & M. Curie, Paris, RONALD PHANEUF, University of Nevada, Reno, STEPHANE TERRACOL, Université P. & M. Curie, Paris and Lawrence Livermore National Laboratory CA, ZUQI XIE, Berkeley Ion Equipments, Santa Clara CA — Slow highly stripped ions approaching or penetrating surfaces are known to capture electrons into outer shells of the ions, leaving the innermost shells empty, and forming hollow atoms. Electron capture occurs above and below the surfaces. The existence of hollow atoms below surfaces e.g. Ar atoms whose K and L shells are empty, with all electrons lying in the M and N shells, was demonstrated in 1990 [1]. At nm above surfaces, the excited ions may not have enough time to decay before hitting the surfaces, and the formation of hollow atoms above surfaces has even been questioned [2]. To observe it, one must increase the time above the surface by decelerating the ions. We have for the first time decelerated O^{7+} ions to energies as low as 1 eV/q, below the minimum energy gained by the ions due to the acceleration by their image charge. As expected, no ion backscattering (trampoline effect) above dielectric (Ge) was observed and at the lowest ion kinetic energies, most of the observed x-rays were found to be emitted by the ions after surface contact.

[1] J. P. Briand et al., Phys.Rev.Lett. **65**(1990)159.

[2] J.P. Briand, AIP Conference Proceedings **215** (1990) 513.

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