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Detecting single graphene layer by using fluorescence from high-speed Ar^{7+} ion[1] YOSHIYUKI MIYAMOTO, Nano Electronics Res. Labs. NEC, HONG ZHANG, School of Physical Science and Technology, Sichuan Univ. — A highly-charged-ion interacting with graphite causes structural change in nano-scales [1]. While when the ion's kinetic energy reaches few MeVs, the induced is not the structural change but electronic excitation. An experiment [2] showed fluorescence from Ar^{7+} ions penetrating through carbon foil with kinetic energy of 2 MeV. Motivated by this experiment, we tested interaction between an Ar^{7+} ion and a graphene sheet by the time-dependent density functional approach, and found that the electronic excitation in the Ar^{7+} ion is also the case even when the incident kinetic energy is 500 KeV and the target thickness is only mono-atomic layer. This simulation suggests the possibility of detecting a suspended mono-atomic layer of graphene [3] by monitoring fluorescence from the penetrated Ar^{7+} ions. We will discuss its importance for analyzing bombardment of solids by highly charged, high-speed ions and possible experiments according to the present result. References: [1] T. Meguro, et al., Appl. Phys. Lett **79**, 3866 (2001). [2] S. Bashkin, H. Oona, E. Veje, Phys, Rev. A**25**, 417 (1982). [3] J. Mayer et al., Nature (London), **446**, 60 (2007).

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