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GUIDED TRANSMISSION OF LOW ENERGY ELECTRONS BY HIGHLY ORDERED Al_2O_3 NANOCAPILLARIES

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Since the first reported results by Stolterfoht *et al.* [1], the guided transmission of charged particles through insulating nanocapillaries has attracted considerable attention. The capillary guiding has potential for investigation of interaction of charged particles with the insulators, characterizing of the inner walls of nanocapillaries and for possible applications (e.g. manipulation of the charged particles on the nanoscale) [2]. Therefore, a number of both experimental and theoretical results have been published on this topic in the last two-three years, mostly focused to highly charged ions (HCIs) as projectiles [3-5] (and references therein). Still, a full understanding of complex processes involved in guiding effect has not been achieved. In particular, the characteristics of *electron guiding* are considered to be unknown at the present.

We present an experimental investigation of guiding of low-energy electrons (200-350 eV) by insulating nanocapillaries [6]. The nanochannels array was prepared using self-ordering phenomena during a two-step anodization process of a high purity aluminium foil. The experimental results clearly show the existence of the guiding effect, as found for HCIs. The guiding of the electron beam was observed for the tilt angles up to 12^o. As seen for HCIs, the guiding efficiency increases with decreasing the incident electron energy. The transmission efficiency appeared to be significantly lower than observed for HCIs and, moreover, the intensity of transmitted electrons significantly decreases with decreasing the incident energy.

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