

A discussion on the maximum charge held by a single particle limited by gas discharge

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Abstract—At a contact/impact charging of a single particle onto a metal target, the total charge on the particle is limited by gas discharge. We have been discussing this problem based on Panchen's gas break down limit. Recently, the gas breakdown characteristics for small gap, especially less than the distance of Paschen's minimum, have been revealed. With the characteristics, the estimated maximum charge on a particle should be modified, especially for small particles. The calculation will be demonstrated and the transition of the particle size range from normal Paschen to co-called extended Paschen regions will be shown.