

## Contribution submission to the conference SKM 2023

### **The role of electron-electron interactions in electron emission from arrays of nanotubes** — •NAIRA GRIGORYAN<sup>1</sup> and PIOTR CHUDZINSKI<sup>1,2</sup>

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Nanotubes and nanorods have been recently established as very good materials to build electron sources in the cold emission process. These are 1D materials where electron-electron interactions are known to play a crucial role in their physics. The interactions in 1D systems lead to a collective modes' physics that is usually described using Tomonaga-Luttinger liquid (TLL) formalism. The advantage is that within this method all correlation functions are known and can be expressed in terms of power laws with non-universal, interaction dependent, exponents. To capture this situation we generalize a canonical Fowler-Norheim theory of field emission to solve the case of a barrier described by any power-law potential. With this generalization, expressed in terms of a confluent hypergeometric function, we are able to compute currents from arrays of carbon nanotubes. We shall present results showing an influence of various interaction terms, as encoded in varying TLL parameters, as well as effects of a finite temperature.

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