

Topic: Technologies and Production Processes in Vacuum Electronics:

Sub-topic: Electron Sources and Electron Emission.

Presentation: Oral presentation strongly preferred.

FIELD ELECTRON EMISSION THEORY FOR VACUUM ELECTRONICS

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ABSTRACT

The process of field electron emission (FE) is relevant to several technological applications of interest to vacuum electronics. In such contexts, it is helpful to be able to accurately simulate the electron emission process itself and (where relevant) the behaviour of technological devices and processes based on FE. It is also necessary to be able to correctly interpret the results of experimental investigations into the behaviour of specific field emitters. A fully realistic theory of FE would be intensely difficult in its fine details, and full understanding seems well beyond the existing frontiers of theoretical physics. Nevertheless, over the last ten years there has been significant progress in physical and mathematical understanding. This paper aims to give a high-level overview of these developments and how they improve our ability to understand and simulate field emitter behaviour in technological contexts, and interpret experimental measurements. Fuller accounts of recent theoretical developments are given elsewhere [1-3].

References

- [1] R.G. Forbes, see [arXiv:1801.08251v2](https://arxiv.org/abs/1801.08251).
- [2] R.G. Forbes, J.H.B. Deane, A. Fischer, and M.S. Mousa, *Jordan J. Phys.* 8, 125 (2015). See [arXiv:1504.06134v7](https://arxiv.org/abs/1504.06134).
- [3] K.L. Jensen, *Introduction to the Physics of Electron Emission* (Wiley, Chichester, UK, 2018).