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Abstract Submitted
for the GEC16 Meeting of
The American Physical Society

Thermoelectric instability of radio-frequency discharges MILES TURNER, Dublin City University — Spatio-temporal instabilities ("striations") are a ubiquitous feature of direct current discharges, understood to be closely linked to the drift of electrons towards the anode. Similar phenomena are observed in high-frequency discharges, but cannot be understood in the same way, because the drift is absent. Explanations in terms of nonlinear ionization mechanisms, such as multi-step ionization, have been suggested but appear to conflict with some observations. In this work we suggest that a usually neglected transport process may be partly or wholly responsible for these instabilities. This process is known as the thermoelectric effect, which is commonly included in the energy transport equation for semiconductor charge carriers, but not usually in moment models of low-temperature plasmas. An investigation of the the moment equations shows that such an instability is possible, and can be observed in simulations.

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Date submitted: 13 Jun 2016 Electronic form version 1.4