

Abstract Submitted  
for the GEC09 Meeting of  
The American Physical Society

**Consequences of the local-mean-energy and the local-field approximation on the similarity parameters of abnormal glow discharges<sup>1</sup>**

GORDON K. GRUBERT, MARKUS M. BECKER, DETLEF LOFFHAGEN, INP Greifswald, Felix-Hausdorff-Str. 2, 17489 Greifswald, Germany — The local-mean-energy approximation and the local-field approximation are commonly applied to include the electron properties like transport and rate coefficients into a hydrodynamic description of gas discharge plasmas. Both the approaches base on the solution of the stationary, spatially homogeneous Boltzmann equation for the electron component, but the consequences of these approaches differ drastically. In particular, the similarity parameters of abnormal glow discharges can be used to illustrate the applicability of both the approximations. Additionally, the influence of rough and extended reaction kinetics has been studied. The analysis of discharges in argon and oxygen as representatives of rare and reactive gases, respectively, leads to the conclusion that the local-mean-energy approximation is to be strongly recommended for the application to hydrodynamic descriptions of discharge plasmas.

<sup>1</sup>This work is supported by the Deutsche Forschungsgemeinschaft within the SFB TR 24.

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Date submitted: 09 Jun 2009

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