

Abstract Submitted
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Improvement of a multi-fluid plasma model for the near-cathode region in thermal plasmas* FRANK SCHARF, RALF PETER BRINKMANN, Ruhr-Universitaet Bochum, Germany — To model and simulate High Intensity Discharge lamps, a proper model for the near-cathode region of thermal plasmas is necessary. Two such models have been presented by the groups around Benilov and Mentel, respectively.^{1,2,3} Both models yield good results for some conditions (defined mainly by differing collision rates), but also non-physical or no results for other conditions. A prominent indicator of the second case is the appearance of super-sonic neutrals. In this contribution a multi-fluid approach incorporating elements from both previous models is presented. In particular, the new model allows for both three body recombination and heavy particle inertia. It thus promises more accurate results over a wider range of physical parameters. Additionally, the new model features a new way to implement the physical boundary conditions numerically. Applying linearization techniques allows a direct, consistent implementation without having to resort to time-consuming shooting methods.

¹M. S. Benilov et al., *Proc. GEC2004*, MT1.002

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³S. Lichtenberg et al., *J. Phys. D: Appl. Phys.* **38** (2005) 3112

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