Abstract Submitted
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On the application of a physically based higher order fluid model for low-temperature plasmas[1] NATHAN GARLAND, RON WHITE, ROBERT ROBSON, ARC Centre for Antimatter-Matter Studies, James Cook University, Townsville, Australia, PETER NICOLETOPOULOS, Faculté des Sciences, Université Libre de Bruxelles, 1050 Brussels, Belgium, SASA DUJKO, Institute of Physics, Pregrevica 118, 11080 Belgrade, Serbia — We present a high resolution, computationally efficient non-local fluid model of a low-temperature parallel plate plasma discharge. The non-local model uses low-order velocity moments of the Boltzmann equation representing particle, momentum and energy balance equations, coupled with Poisson's equations to determine space-charge fields. The system of equations is closed used a physically sound heat flux ansatz [1]. A new scheme is implemented for prescribing the relevant collisional terms in the balance equations, based on available electron swarm transport coefficients [2]. The model is applied to simulation of various configurations including the Gaseous Electronics Conference (GEC) reference cell and compared to previous models of the system. Results of the model yield spatial and temporal profiles of electron densities, flux and energy in addition to electric field distributions inside the GEC reference cell. In this paper, we highlight differences associated with local and non-local fluid equation treatments, as well as highlight the importance of correct implementation of electron swarm transport data. [1] R.E. Robson, R.D. White and Z. Lj. Petrovic, Rev. Mod. Phys. 77, 1303 (2005) [2] R.E. Robson, P. Nicoletopoulos, M. Hildebrandt and R.D. White, J. Chem. Phys. (sub

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