A new approach to fluid modeling of Resistive Plate Chambers SASA DUJKO, DANKO BOSNJAKOVIC, ZORAN PETROVIC, Institute of Physics, University of Belgrade, Serbia — We present a 1.5-dimensional model of Resistive Plate Chambers (RPCs) which are used for timing and triggering purposes in many high energy physics experiments. The model is based solely on the hydrodynamic approximation and assumes that the electron collisional source term in the continuity equation can be expanded in terms of gradients of the electron number density. Transport data used in this model are calculated using Monte Carlo simulations and a multi term solution of the Boltzmann equation. The model is employed to study the avalanche to streamer transition in RPCs under the influence of space charge effects and photoionization. In addition, this model is also used to calculate the average induced signals for different RPC configurations and applied electric field strengths. The results are compared with those obtained by classical fluid model with flux or bulk transport data as input parameters. Depending on the specific RPC configuration and applied electric field, the results for the induced charges calculated using these fluid models can differ as much as several hundred percents.

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