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**The Monte-Carlo get finished in hollow cathode theory – a source equation is incoming!** VLADIMIR GORIN, Kyiv National Taras Shevchenko University — The *hollow cathode effect* (HCE) in glow discharge occurred rather hard bean for theoreticians. Classical local Engel and Shtenbek cathode dark space theory does not work under conditions of HCE because it is not possible to neglect inertia of electron here. The electron distribution function has many features and it is far from Maxwellian one. The absence of non-local source model from Paschen invention of a hollow cathode in 1916 till today forced to use Monte-Carlo methods. It meant an absence of any equation for a source of ionization in a hollow cathode! Time to find this equation is coming. It is an integral equation, which is derived from kinetic equation and determines a non-local dependence of ionization source on electric field through phase trajectories of electron motion. When simplification of local dependence is possible, the equation can be transformed into ordinary differential equation and then it is coincident with a continuity equation of classical Engel-Shtenbek model. In joining with field equations the source equation enables to calculate current voltage characteristics of simple glow and hollow cathode discharge and see the HCE in mathematical simulation.

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