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The solution of a steady state discharge is time-independent, but for the computational convenience the time-dependent term is added to the species transport equations. Although they are coupled with the electric field E with Poisson equation, usually they are not solved together due to the huge computational cost but solved consecutively in the way of Gummel iteration. In this procedure if E is treated explicitly, then the time step has a severe restriction for avoiding numerical instabilities. A so-called semi-implicit treatment (Ventzek) can be used to eliminate the time step restriction and ensure stability. Using this technique, the time step can be several orders of magnitude larger than that given by the constraint. But for different numerical method, the numerical flux has different forms, as a result, for different methods this technique should be done in a different way. In this poster we present a simpler way which can avoid the time constraint as well as the semi-implicit treatment from the point of view of mathematics, that is, the potential V is regarded to be time-dependent as well as the species densities. The results of the two treatments are compared.