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Vlasov-Poisson calculations of electron confinement times in Polywell(TM) devices using a steady-state particle-in-cell method[1] JEFFREY KOLLASCH, CARL SOVINEC, JOHN SANTARIUS, University of Wisconsin - Madison — Collisionless electron confinement times in polyhedral magnetic cusp configurations are investigated numerically with a particle-in-cell technique designed for steady-state conditions of the Vlasov-Poisson system. This method is based on iteratively solving particle trajectories in the time-independent electrostatic field produced by trajectories from a previous iteration. A new code based on this technique, SSUBPIC (steady-state unstructured-boundary particle-in-cell), is presented. It is found to converge rapidly for the cases investigated. The implementation is verified on computations of space-charge limited current in 1D and 2D configurations. Here, it is applied to study the effects of an ejecting virtual cathode potential well on a single electron species injected by guns into a Polywell(TM). Adverse effects of non-magnetically shielded structural members on confinement time are also calculated.

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