

Abstract Submitted
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**Electron Banana Width Effect and Density Pump-out
in ECCD Experiments¹**

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C.C. PETTY, R. PRATER, GA, R.J. JAYAKUMAR, LLNL — When
averaged over the finite banana orbit, an energetic trapped electron sees
a nonzero parallel electric field if it is spatially inhomogenous. With
some simplifying assumptions, it is shown that the energetic trapped
electron dynamics can be described by the Smoluchowski equation. A
simple criterion is derived to assess its significance in ECCD experi-
ments. In small tokamak experiments like the WT-3 device where den-
sity is low and the inductive electric field can change rapidly in time, the
finite electron banana width can cause the energetic electrons to pile up
near the trapped-passing boundary, leading to an enhanced bootstrap
current. For the DIII-D experimental parameters, this effect becomes
negligibly small. During high power ECCD in the plasma core of DIII-D,
significant decrease of electron density was observed. It is possible that
the highly localized power absorption produces a poloidal electric field
and a radial convective plasma flow. This conjecture will be compared
with experimental data from the motional Stark effect diagnostic.

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