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Trapped Electron Corrections to Ohkawa Current in General Tokamak Equilibria[1] Y.R. LIN-LIU, F.L. HINTON, General Atomics — It is well known that trapped electrons play an important role in determining the amount of neutral beam current drive (NBCD) in toroidal geometry. Previous theoretical considerations of the trapped electron effect have been limited to either the case of large aspect ratio or that of low-β circular cross section model equilibria. To model NBCD in strongly shaped tokamak plasmas, particulary at the low aspect ratio, we consider the trapped electron effect in general tokamak geometry. We show that the electron contribution to NBCD is closely related to that of the neoclassical bootstrap current. In particular, in the limit of the electron thermal velocity greatly exceeds the fast ion velocity, the trapped electron correction to the Ohkawa current and the electron density gradient contribution to the bootstrap current are shown to share the same transport coefficient in the banana regime. For this particular transport coefficient, an accurate analytic expression exists which is applicable to low and high β equilibria in general tokamak geometry. This should suffice for modeling the trapped electron contribution to NBCD in most parameter regimes of current experimental interest in both finite and low aspect ratio tokamaks.

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☐ Prefer Oral Session
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