Sorting Category: 5.6.2 (Theoretical)

Modeling Current Hole Tokamaks[1] T.H. JENSEN, GA —
Three examples of experimentally obtained current hole tokamaks have
been reported [1,2,3]. For the modeling discussed here, the key assump-
tions made are: i) existance of an impediment to poloidal currents [4]
resulting in beta poloidal $\sim$ unity and ii) that the plasma current is
driven by a radially outwards mass flow resulting from neutral beam
injection. Quite detailed agreement is found between experimental re-
sults [3] and modeling results. Using the experimentally observed rates
of beam injection density and the Spitzer conductivity (in the toroidal
direction) for the observed temperature and effective Z, the model pro-
vides a current hole with a size similar to that observed. The significance
of this is that current hole tokamaks driven by neutral beam injection
may be an attractive way for realizing dc operation of tokamaks.

[1] T.S. Taylor, et al., Bull. Am. Phys. Soc. **43**, 1763 (1998).
[2] N.C. Hawkes, et al., Phys. Rev. Lett. **87**, 115001 (2001).
[3] T. Fujita, et al., Phys. Rev. Lett. **87**, 245001 (2001).
[4] T.H. Jensen, Phys. Plasmas **9**, 2857 (2002).

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