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SOL Thermal Instability due to Radial Blob Convection[1] D.A. D'IPPOLITO, J.R. MYRA, D.R. RUSSELL, Lodestar Research Corporation — C-Mod data[2] suggests a density limit when rapid perpendicular convection dominates SOL heat transport. This is supported by a recent analysis[3] of BOUT code turbulence simulations, which shows that rapid outwards convection of plasma by turbulent blobs is enhanced when the X-point collisionality is large, resulting in a synergistic effect between blob convection and X-point cooling. This work motivates the present analysis of SOL thermal equilibrium and instability including an RX-regime model[4] of blob particle and heat transport. Two-point (midplane, X-point) SOL thermal equilibrium and stability models are considered including both two-field (T) and four-field (n,T) treatments. The conditions under which loss of thermal equilibrium or thermal instabilities occur are established, and relations to the C-Mod data are described.

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[2]M. Greenwald, Plasma Phys. Contr. Fusion **44**, R27 (2002).
[3]D.A. Russell et al., Phys. Rev. Lett. **93**, 265001 (2004).
[4]J.R. Myra and D.A. DIppolito, Lodestar Report LRC-05-105 (2005).

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