

The relationship between divertor heat flux width and critical pressure gradient limits in tokamaks

M.A. Makowski¹, C.J. Lasnier¹, A.W. Leonard², J.H. Nichols³, T.H. Osborne²,
and P.C. Stangeby⁴

¹*Lawrence Livermore National Laboratory, Livermore, California 94550, USA*

²*General Atomics, P.O. Box 85608, San Diego, California 92186-5608, USA*

³*Princeton Plasma Physics Laboratory, Princeton, New Jersey, USA*

⁴*University of Toronto Institute of Aerospace Studies, Toronto, Canada*

Abstract. Evidence that establishes a relationship between the measured heat flux width and a critical gradient model is presented. It is found that the critical pressure gradient obtained from ideal, infinite-n ballooning mode theory is at or slightly above the measured pressure gradient at the separatrix and scales similarly for several parameter scans. In addition, the measured divertor heat flux width is well approximated by an expression obtained from a kinetically corrected two-point model for the parallel heat flux applied to the upstream profile measurements.