Advanced analysis of tearing mode evolution based on the KSTAR ECEI diagnostics*

M. J. Choi, G. S. Yun, W. Lee, G. Kim, H. K. Park  
C. W. Domiera, N. C. Luhmann, Jr., K. J. Gibsonb, C. Bowmannb  
J. G. Bakc, S. G. Leec, and KSTAR team

Pohang University of Science and Technology, Pohang, Gyungbuk 790-784, Korea  
a University of California at Davis, Davis, CA 95616, USA  
b University of York, Heslington, York YO10 5DD, UK  
c National Fusion Research Institute, Daejeon 169-148, Korea

cmj0417@postech.edu

An accurate evaluation of the Tearing Mode (TM) instability parameters such as the TM index ($\Delta'$) and critical island width ($w_c$) is important in explaining the TM evolution with the Modified Rutherford Equation (MRE) [1]. An advanced technique to measure $\Delta'$ and $w_c$ experimentally using 2-D Electron Cyclotron Emission Imaging (ECEI) diagnostics has been developed. For the determination of $\Delta'$, the Ren’s TM flux surface model [2] is used to generate 2D temperature profiles, which are transformed to synthetic ECEI data to be compared with the measured ECEI data. Similarly, for $w_c$, the Fitzpatrick’s transport equation of electron temperature near the TM island is solved numerically using Snape’s approach [1] and compared with the ECEI measurement. The framework of TM evolution analysis with the MRE will be discussed under additional constraints from a self-consistent M3D modeling. *Work supported by NRF of Korea under contract No. 20120005920 and the U. S. DoE under contract No. DE-FG-02-99ER54531.