Modeling TAE Response To Nonlinear Drives BO ZHANG, HER-
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Austin — Experiment has detected the Toroidal Alfven Eigenmodes (TAE) with
signals at twice the eigenfrequency.These harmonic modes arise from the second or-
der perturbation in amplitude of the MHD equation for the linear modes that are
driven the energetic particle free energy. The structure of TAE in realistic geometry
can be calculated by generalizing the linear numerical solver (AEGIS package). We
have have inserted all the nonlinear MHD source terms, where are quadratic in the
linear amplitudes, into AEGIS code. We then invert the linear MHD equation at the
second harmonic frequency. The ratio of amplitudes of the first and second harmonic
terms are used to determine the internal field amplitude. The spatial structure of
energy and density distribution are investigated. The results can be directly em-
ployed to compare with experiments and determine the Alfven wave amplitude in
the plasma region.

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Date submitted: 09 Jul 2012　　　　　　　　　　　　　Electronic form version 1.4