

2P 1 INHOMOGENEOUS EMITTER FROM THE FIVE BRANCH CYCLOTRON LAYER* C. S. Ng, V. F. SHVETS, and D. G. SWANSON, *Auburn University, AL 36849-5311, USA*. Recent developments in mode conversion theory as applied to spontaneous emission from inhomogeneously magnetized plasmas^{1,2}, allow one to construct, by regular analytical procedures, a spatial emission source distribution for a simple three-wave coupling system³. Besides obvious theoretical interest, the problem of the source distribution has clear applied significance associated with the location of radiative regions in magnetic fusion and space plasmas. Here, our previous results are extended and generalized to the five branch mode conversion problem. The generalization is not obvious since even in simplest cases of the coupling of five branches (counterpropagating X-mode and O-mode and an electron Bernstein wave near second or third electron cyclotron harmonics) the structure of the governing equation which is now of sixth or eighth order, turns out to be much more complicated. Explicit expressions for absorbed and emitted energy fractions as well as the relation between matrix element of the absorption problem and scattering parameters are obtained. A variational problem for an inhomogeneous source is formulated and solved. Computations demonstrate a number of qualitative differences between local emission and absorption profiles relative to those without any mode conversion. The basic features, however, are generally similar to those of the three branch mode conversion problem. In particular, a strong tendency for distributed emitters to be more highly localized than absorbers is shown in addition to a systematic shift.

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