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On Supplementary Heating of Fusion Plasmas by Means of Alfvén Waves (Classic Reprint) (Paperback)

By J A Tataronis

Forgotten Books, United States, 2015. Paperback. Book Condition: New. 229 x 152 mm. Language: English . Brand New Book ***** Print on Demand *****.Excerpt from On Supplementary Heating of Fusion Plasmas by Means of Alfvén Waves A comprehensive treatment of the theory of rf energy absorption in inhomogeneous plasmas by means of Alfvén waves is presented. A straight cylindrical plasma column whose motion is governed by linearized ideal magnetohydrodynamics (Mhd) is assumed to be surrounded by a vacuum region in which an ideal coil consisting of surface currents is placed. The coil is oscillated at frequencies which lie in the Mhd continuous spectrum of local Alfvén frequencies of the inhomogeneous plasma leading to the occurrence of local Alfvén resonances. A rigorous self-consistent analysis of the resulting resonant energy absorption is presented along with calculations relevant to present and future fusion devices. Specifically, the experimentally useful coil impedance is calculated for a plasma-vacuum-coil-wall system with realistic nonuniform plasma profiles corresponding to present day Tokamak and Scyllac devices. Impressively large coupling and absorption is indicated for such devices independent of the value of total plasma β . Significant differences occur however for variations in the spatial plasma profiles. Consequently accurate scaling estimates of...



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