Abstracts

Plasma Diagnostics with a Microwave Fabry-Perot Resonator

R.J. Chaffin and J.B. Beyer. "Plasma Diagnostics with a Microwave Fabry-Perot Resonator." 1968 Transactions on Microwave Theory and Techniques 16.1 (Jan. 1968 [T-MTT]): 37-45.

Plasma diagnostics with a confocal spherical mirror Fabry-Perot resonator are examined. The diagnostic equations are presented and experimentally verified. The measurable ranges of electron densities and collision frequencies are treated both theoretically and by example. A brief background of the theory of the resonator is summarized (with references) from the literature. A perturbational technique for measuring collision frequency, or Q change, through the variation of a resonator's transmission coefficient at resonance (for a general resonator) is derived, and the results experimentally verified. This technique could be a powerful diagnostic tool and is shown to have certain advantages under noisy conditions. This type of resonator is simple and inexpensive to construct, easy to align, and gives very good diagnostic results.

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