

Conceptual design of a 325 MHz Inductive Output Tube (IOT)

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Abstract: Inductive Output Tube (IOT) is a vacuum electronic device used for generation of radio frequency power. IOT based RF amplifiers are used in accelerator systems, industrial heating systems among other applications. It is compact in size and provides linear operation over its entire operating range with efficiency varying from 60 to 70 percent. This paper proposes the conceptual design of an IOT operating at 325 MHz with an RF power of 100 kW at an efficiency of approximately 70%. The design of all the sub components of the IOT viz. the gridded electron gun, the input and output cavities, magnetic circuit, collector are discussed in this paper. The input cavity is a TM₀₁ mode coaxial cavity while the output cavity is a TM₀₁ mode re-entrant cavity. The magnetic circuit is designed to provide a Brillouin focusing to the electron beam. The simulation of the integrated model of IOT and studies of effect of the output gap and the R/Q of the output cavity on the efficiency and output power level are discussed and will be presented.

Keywords: Accelerators, Amplifiers, Brillouin focusing, gridded electron gun, the input cavity, IOT, output cavity, R/Q

Footnotes

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