

## Design of a Cavity Phase Shifter (CPS) in MHz range.

### 1. Background of the problem

High power radio frequency waves in the megahertz frequency range have a wide range of application like tokamak fusion reactor, accelerators, aerospace and defense sector. The RF waves can be transmitted via rigid coaxial transmission lines (TL) at high power. In order to radiate the desired wave spectrum from an antenna, it is imperative to use line stretcher to change the phase of the travelling wave inside the TL. This is achieved by altering the electrical length of the TL. Since they change the phase of the wave that reaches at the antenna, they are called as Phase Shifter. In this work a novel design of PS using a cavity resonance would be employed to achieve desired RF parameters.

### 2. Scope of work

The student would survey available literature about high power TL, theory of Phase Shifter and cavity resonators. The model has to be designed in a commercial 3D structural simulator Ansys-HFSS and various parameters would be optimized.

### 3. Academic gain of the student

Understanding knowhow of high power TL design, Ansys HFSS (High Frequency Structural Simulator) and design of RF components.

Relevant references:

1. <https://www.ansys.com/en-in/products/electronics/ansys-hfss>
2. K. Mishra et. al. Journal of Physics: Conference Series 208 (2010) 012017

**Eligibility: Only students of Electrical/ Microwave & RF branches can submit their application at**

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