

## **Abstract**

Two kinds of disk-loaded waveguides are designed for the accelerating section and buncher, respectively. For the acceleration section, the structure is completely periodic and the phase velocity is equal to speed of light for the TM<sub>01</sub> electromagnetic wave with 2997.92±0.08 MHz frequency. In the buncher, the structure smoothly changed due to smoothly phase velocity increasing. This was done to bunch the continuous electrons from the electron gun with about 45 KeV kinetic energy ( $\beta=0.4$ ) and also accelerate them to ultra-relativistic region to be ready for the accelerator section. Also, two kinds of couplers are design to connect the waveguides from klystron to the buncher and accelerator section, respectively. These couplers should be tuned to reach minimum reflection and the correct mode inside the accelerator section and buncher.