MATTER AND TECHNOLOGIES

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Characterization of an Electron Gun Test Setup based on Multipactor

A multipacting electron gun (MEG) is a micro-pulse electron source, based on secondary electron emission in a resonant microwave cavity structure, for the generation of bunched low-emittance electron beams in continuous wave operation. Based on numerical simulations, an experimental test setup for low-energy electron bunches at the frequency of 2.998 GHz has been established. Here, the mechanical design of the experimental configuration as well as the power transmission into the gun cavity plays an important role for stable MEG operation. In the early stage of the experiment we use the output beam current as the measurable quantity for optimization studies of the modifiable parameter space with respect to electron emission. This denotes the first step in the development of an MEG setup for higher energetic electron beams and subsequent investigation of essential beam characteristics like emittance and energy distribution for further optimization with regard to best possible beam quality and future fields of application.

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