

Reduction of multipacting effect

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Technical Description:

Multipacting, also called multipactoring, is a phenomenon of resonant electron multiplication in a vacuum to which an RF or microwave (MW) field is applied. Multipacting occurs when electrons in the RF or MW field oscillate synchronously and lead to a secondary emission of electrons when hitting electrodes or other surfaces of the enclosure. If the secondary electron yield (SEY), i. e. the average number of electrons emitted by a surface when hit by an electron is larger than one, the number of electrons constantly increases and builds up an electron avalanche, which in turn leads to remarkable power losses and heating of the enclosure walls. The invention relates to an apparatus comprising an enclosure suitable for forming a vacuum therein and means for at least partially suppressing a multipacting effect when an RF- or microwave electromagnetic field is generated in the vacuum. The invention further relates to a method of forming such apparatus and a method of at least partially suppressing multipacting effects in a vacuum enclosure.

Pros:

- Reduce SEY without significant loss of signal.
- Enable increased RF power in accelerators and for satellites without distorting the signal
- No adding of roughness is necessary.

Cons

- Technology not yet fully tested in real life environment.

IP Status:

Technology maturity: Proof of concept stage. Need more R&D.

Patent status and reference: Patent pending.

Accessibility: License available from CERN.

Market/Application suggestions:

The ability to reduce the SEY at a low cost to prevent significant loss in the signal (compared to the present solutions) should make this technology interesting to the industry. It can be applied in satellites (waveguides or microwave filters), linear accelerators (medical treatment) and possibly TV and satellite broadcasting as in radar.