Contribution ID: **643** Contribution code: **WEPA122** Type: **Poster Presentation**

Dielectric Assist Accelerating structures for compact linear accelerators of low energy particles in hadrontherapy treatments

Wednesday, 10 May 2023 16:30 (2 hours)

Dielectric Assist Accelerating (DAA) structures based on ultralow-loss ceramic are being studied as an alternative to conventional disk-loaded copper cavities. This accelerating structure consists of dielectric disks with irises arranged periodically in metallic structures working under the TM02-π mode.

Here, the numerical design of an S-band DAA structure for low beta particles, such as protons or carbon ions used for hadrontherapy treatments, is shown. Three dielectrics with different permittivity and loss tangent are studied as well as different particle velocities depending on the energy range.

Through optimization, most of the RF power is stored in the vacuum space near the beam axis, leading to a significant reduction of power loss on the metallic walls. This allows to realize cavities with extremely high quality factor over 100 000 and shunt impedance over 300 MΩ/m at room temperature.

The design optimization has been improved to reduce the peak electric field in certain locations of the cavity. In addition, first multipactor simulations are being carried out, using several coatings to reduce SEY, which has also been taken into account in the electromagnetic result.

Funding Agency

Footnotes

I have read and accept the Privacy Policy Statement

Yes

Primary author: MARTINEZ-REVIRIEGO, Pablo (Instituto de Física Corpuscular)

Co-authors: BLANCH GUTIERREZ, Cesar (European Organization for Nuclear Research); ESPERANTE, Daniel (Instituto de Física Corpuscular); FUSTER, Juan (Instituto de Física Corpuscular); FUSTER, Nuria (Instituto de Física Corpuscular); GIMENO-MARTINEZ, Benito (Val Space Consortium); GONZALEZ-IGLESIAS, Daniel (Instituto de Física Corpuscular); GRUDIEV, Alexej (European Organization for Nuclear Research); MARTÍN-LUNA, Pablo (Instituto de Física Corpuscular); MARTÍNEZ LÓPEZ, Eduardo (Instituto de Física Corpuscular); MENÉNDEZ, Abraham (Instituto de Física Corpuscular)

Presenter: MARTINEZ-REVIRIEGO, Pablo (Instituto de Física Corpuscular)

Session Classification: Wednesday Poster Session

Track Classification: MC7: Accelerator Technology and Sustainability: MC7.T06: Room Temperature RF