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Multipactor studies for the FCC-ee superconducting swell cavities

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The Future Circular Collider (FCC) is a project of high performance particle collider. Several accelerating cavity technologies may equip it and are currently under study. One of them is the Slotted Waveguide ELLiptical (SWELL) superconducting (SC) cavity. It is a good candidate for nearly all the range of electron-positron interaction energies. It is made up of four independent quadrants clamped together, allowing for a seamless and very stiff structure. One of the important issues that remain to be addressed is the position of the multipactor barriers. In this study, we focus on the SWELL 1.3 GHz mono-cell prototype, which is very close to the well-known TESLA cavity. We calculated the position of its multipactor barriers using the simulation tools CST Microwave Studio and SPARK3D. These calculations were backed by electron emission measurements led on a Nb sample representative of the cavity's coating. These are focused on the impact energy range between 0 and 80 eV. As a matter of a fact, we found it to be very important for the multipactor apparition while often being overlooked.

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Footnotes

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Primary author: PLAÇAIS, Adrien (Laboratoire de Physique Subatomique et de Cosmologie)

Co-authors: BOULY, Frédéric (Laboratoire de Physique Subatomique et de Cosmologie); GÓMEZ MARTÍNEZ, Yolanda (Laboratoire de Physique Subatomique et de Cosmologie); MEYER, Manon (Laboratoire de Physique Subatomique et de Cosmologie); FAUS-GOLFE, Angeles (Université Paris-Saclay, CNRS/IN2P3, IJCLab); PEAugER, Franck (CERN); GORGI ZADEH, Shahnam (European Organization for Nuclear Research)

Presenter: PLAÇAIS, Adrien (Laboratoire de Physique Subatomique et de Cosmologie)

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