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RF in situ heating of a single and nine cell 1.3 GHz cavity

Thursday 25 September 2025 14:30 (3 hours)

High acceleration gradients Eacc and high quality factors Q0 can be achieved by heat treatments of the cavity [1]. However, the heating processes are carried out in furnaces where the cavity is forcibly exposed to air afterwards, which can lead to contamination. For moderate temperatures (T < 350 ℃), this issue could be overcome by in-situ heating. A few studies on in-situ heating have already been published, showing promising results [2]. But, the heating was achieved using heating strips, which are not applicable in an accelerator cryomodule. By applying a radio frequency electromagnetic field at RT to the cavity (here called RF-heating), the cavity can be heated under UHV conditions without being exposed to air. Furthermore, this setup could be implemented in the module, which is beneficial for accelerators that don't have the option of gas processing. A first study reporting on RF heating, still in its early stages, was published recently [3]. In the work presented here, we will further investigate RF heating and explain the experimental setup. In addition, first heating results for a 1.3 GHz nine-cell and a single-cell cavity will be presented, whereby temperatures in the mid-T range (approx. 240 ℃) have already been achieved for a single cell with the current setup.

I have read and accept the Privacy Policy Statement

Yes

Footnotes

[1] L. Steder et al.,2024 , https://doi.org/10.48550/arXiv.2407.12570
[2] S. Posen et al.,2020 , Phys. Rev. Applied 13, 014024
[3] H.-W. Glock et al.,2024, https://doi.org/10.48550/arXiv.2412.13628

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Author: GOEDECKE, Julia (Deutsches Elektronen-Synchrotron DESY)

Co-authors: BÜTTNER, Thorsten (Deutsches Elektronen-Synchrotron DESY); KASPRZAK, Karol (Deutsches Elektronen-Synchrotron DESY); MARCONATO, Giovanni (Università degli Studi di Padova); RESCHKE, Detlef (Deutsches Elektronen-Synchrotron DESY); STEDER, Lea (Deutsches Elektronen-Synchrotron DESY); WIENCEK, Mateusz (Deutsches Elektronen-Synchrotron DESY); SULIMOV, Alexey (Deutsches Elektronen-Synchrotron DESY); WEISE, Hans (Deutsches Elektronen-Synchrotron DESY)

Presenter: GOEDECKE, Julia (Deutsches Elektronen-Synchrotron DESY)

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