Contribution ID: **54** Type: **not specified**

RF system design for the CEPC main ring

Tuesday, May 30, 2017 8:30 AM (20 minutes)

CEPC is a 100 km double-ring circular electron positron collider operating at 90-240 GeV center-of-mass energy of Z-pole, WW pair production threshold and Higgs resonance. CEPC and its successor SPPC, a 100 TeV center-of-mass super proton-proton collider, will ensure the elementary particle physics a vibrant field for decades to come. To reduce the overall cost, partial double ring scheme was proposed as the alternative, which has a significant impact on the cavity operation and beam dynamics. The conceptual design report (CDR) of CEPC will be completed in the end of 2017 as an important step to move the project forward. In this talk, CEPC SRF system design and the progress of key technology R&D will be shown, including SRF staging scenarios in terms of RF power, key parameter choices and system configuration at different operation energies of both Main Ring and Booster, bunch train beam loading and phase shift compensation, coupled bunch instabilities and HOM coupler design, as well as high Q cavity, variable input coupler, tuner and cryomodule concepts.

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Session Classification: RF