

Update on the sc 325 MHz CH-Cavity and Power Coupler Processing*

M. Busch[#], M. Amberg, M. Basten, F. Dziuba, P. Mundine, H. Podlech, U. Ratzinger

IAP University of Frankfurt, 60438 Frankfurt am Main, Germany

Abstract:

The 325 MHz CH-Cavity which has been developed and successfully vertically tested at the Institute for Applied Physics, Frankfurt, has reached the final production stage. The helium vessel has been welded to the frontal joints of the cavity and further tests in a horizontal environment are in preparation. The corresponding 325 MHz power couplers have been conditioned and tested at a dedicated test stand up to the power level of 40 kW (pulsed) for the targeted beam operation. The final step of the whole prototype development is a beam test with a 11.4 AMeV, 10 mA ion beam at GSI, Darmstadt. Furthermore a test stand for 217 MHz power couplers for the sc cw LINAC at GSI is in preparation.

325 MHz CH-Cavity Status Update

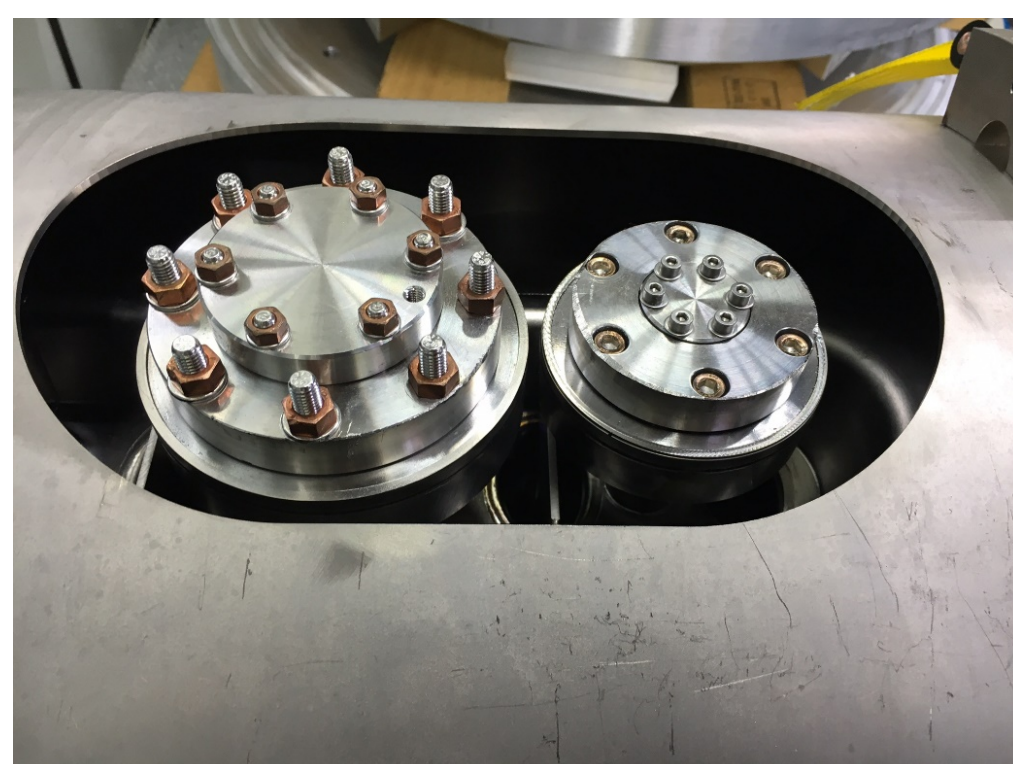
After successful tests with gradients up to 14.1 MV/m at 2 K the cavity was sent back to Research Instruments for final weldings of the helium vessel. Unfortunately the final leak tests discovered a small leak inside the membrane bellow within the port for the power coupler. Due to the complex position it was decided to cut out a race track profile around the coupler ports including the membrane bellows. A replacement structure is being produced and will be installed within the next weeks.



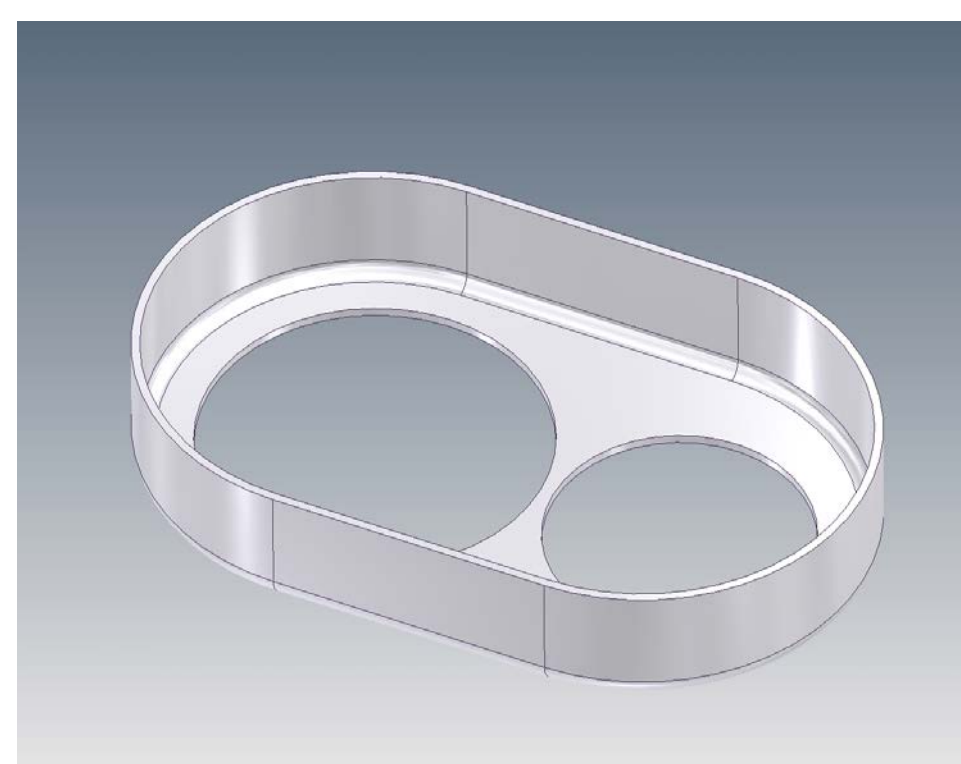
Cut view of the CH-Cavity.



Position of the leak (coupler port).



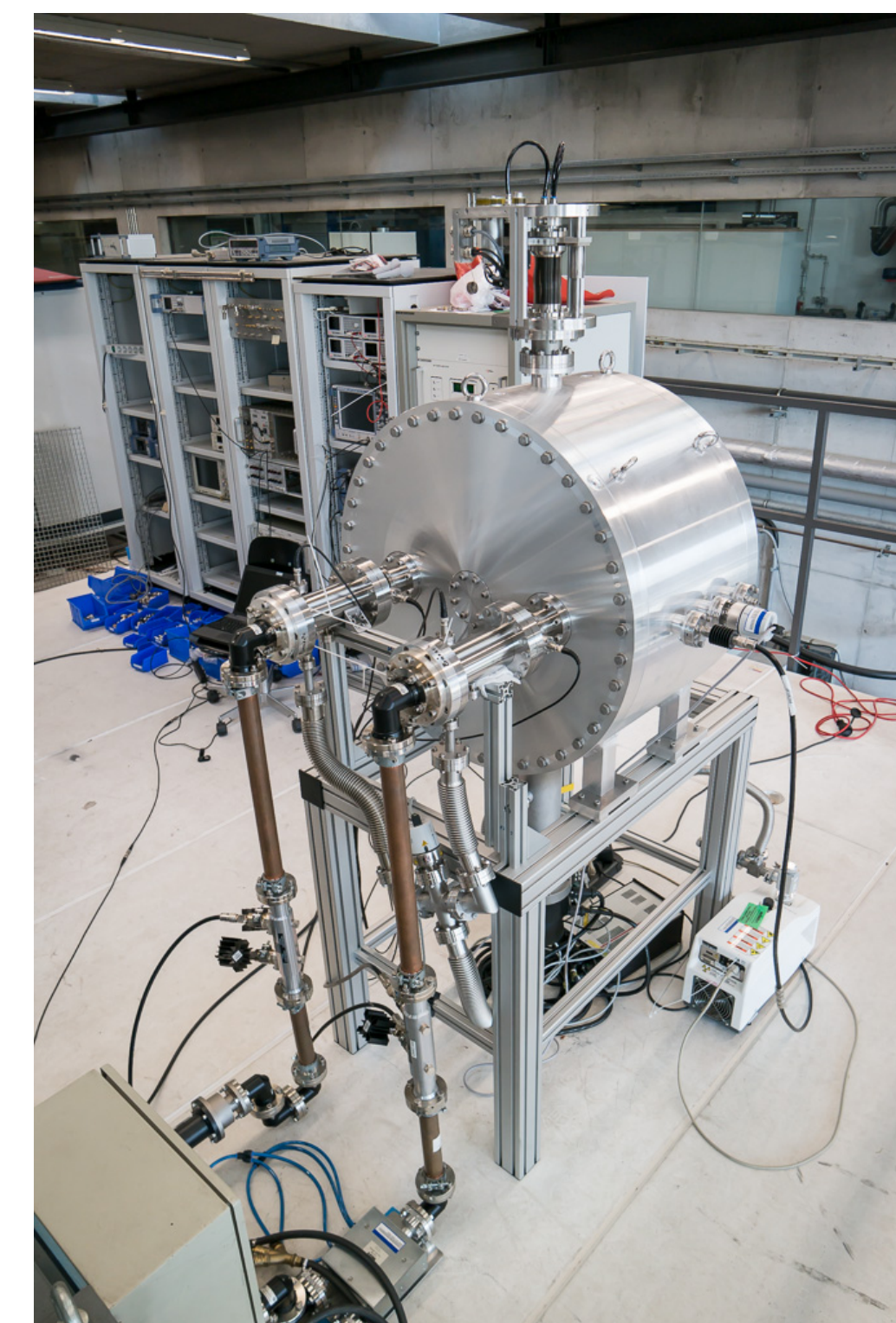
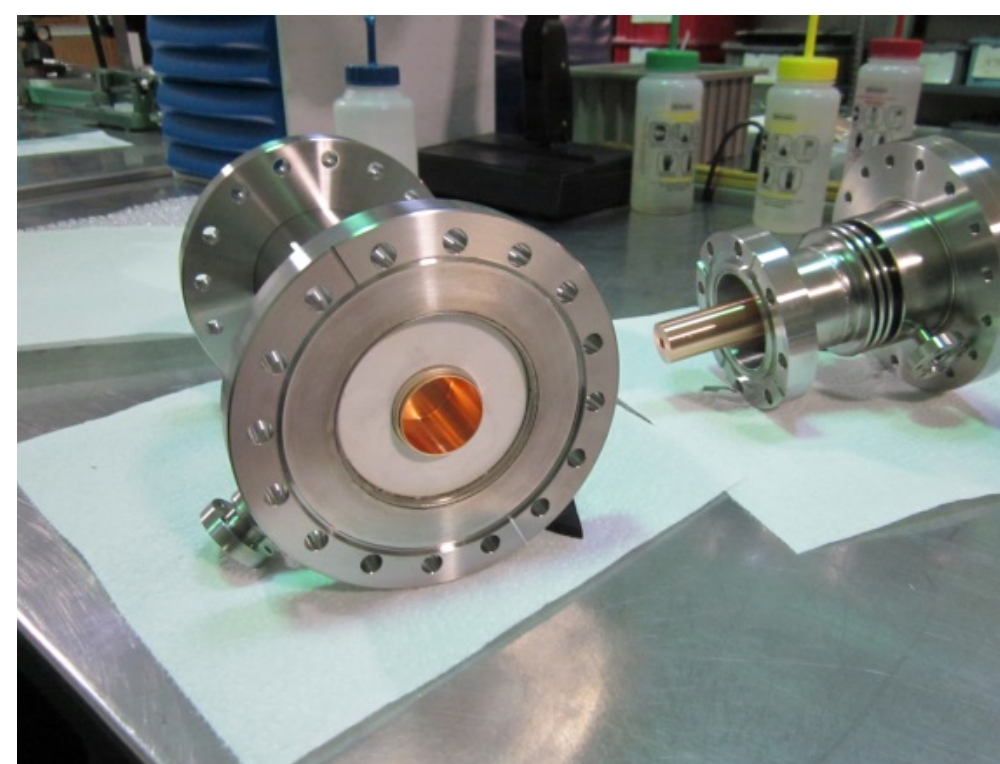
Separated helium vessel.



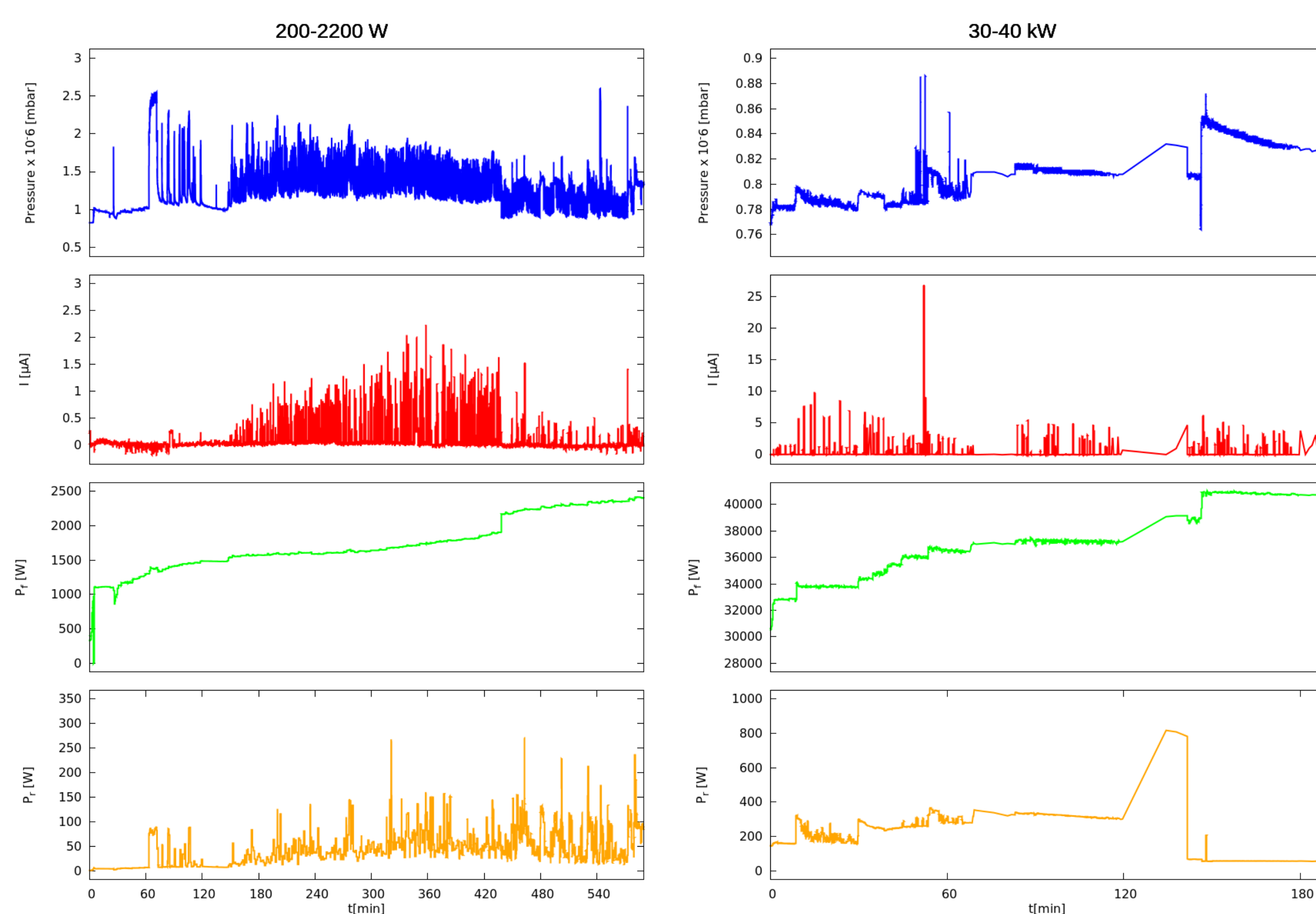
Replacement for the leaked bellows.

325 MHz Power Coupler Test and Conditioning

For the tests of the 325 MHz power couplers a dedicated test stand has been arranged. This setup has enabled two power couplers linked by a pill-box cavity being conditioned up to 40 kW pulsed power. Besides the power measurement the current of the Langmuir probes as well as the pressure between the alumina windows has been recorded to detect Multipacting events.

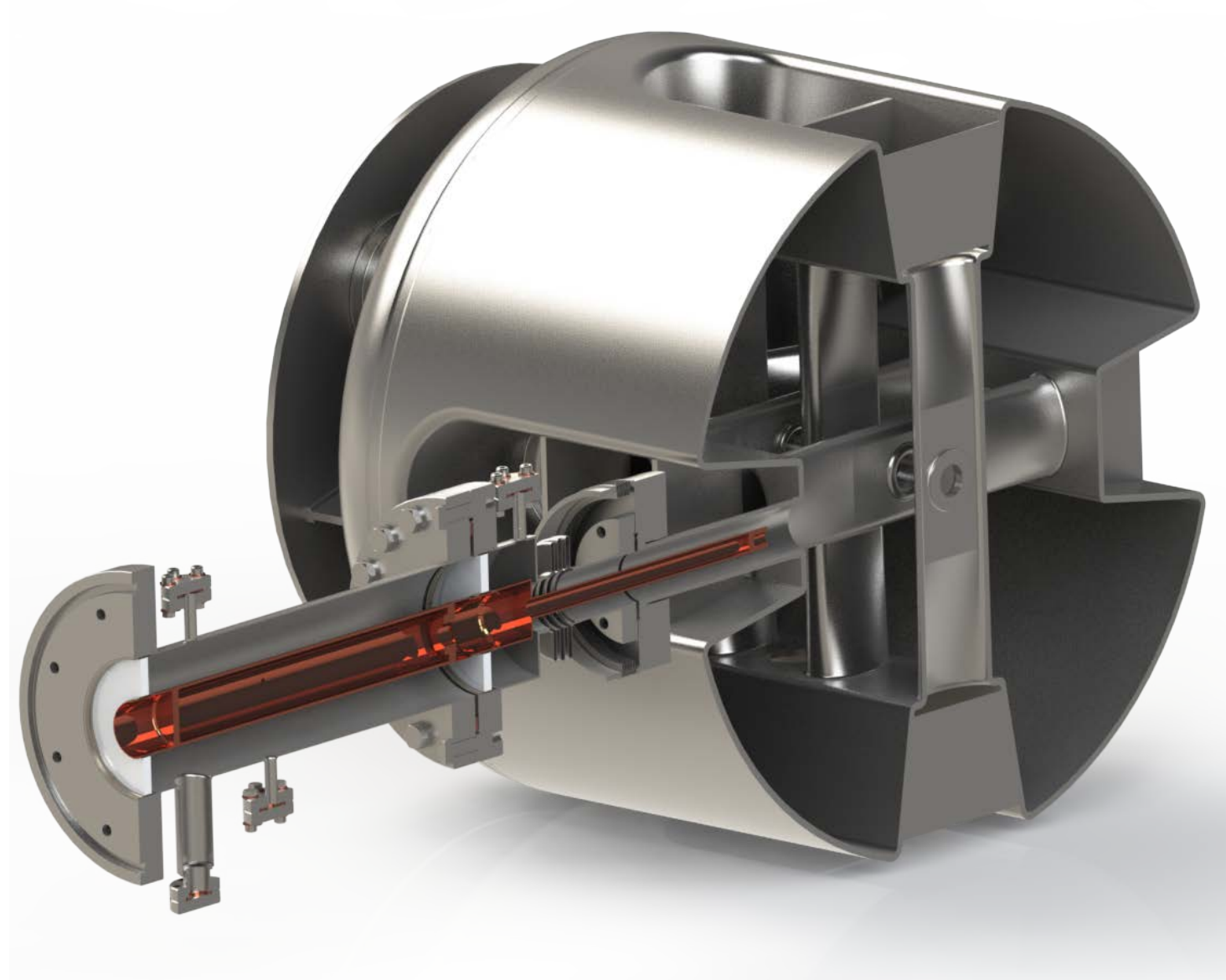


Assembly of the power coupler test stand.



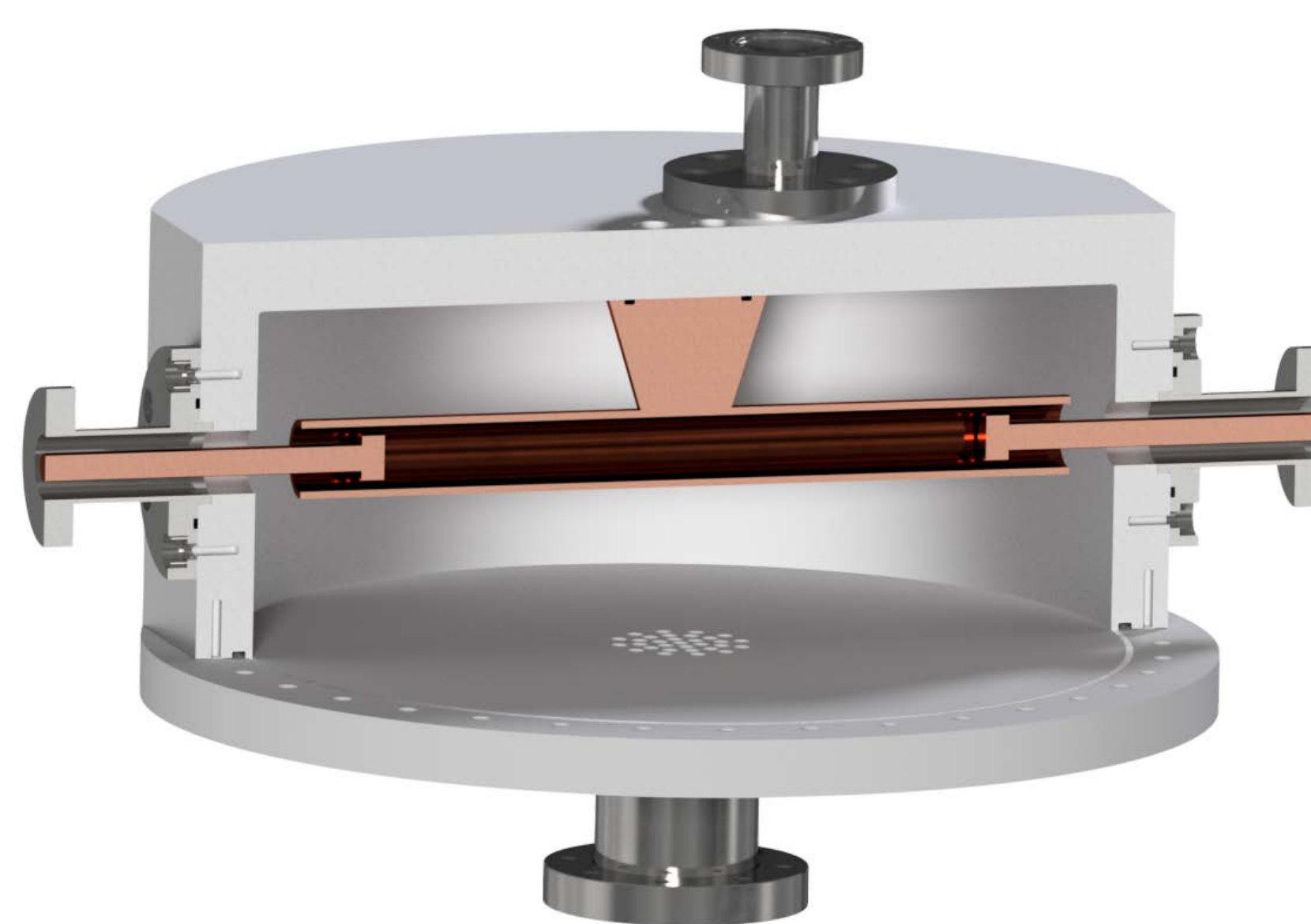
Recorded values for low and high power conditioning.

Outlook: Test bench for 217 MHz power couplers

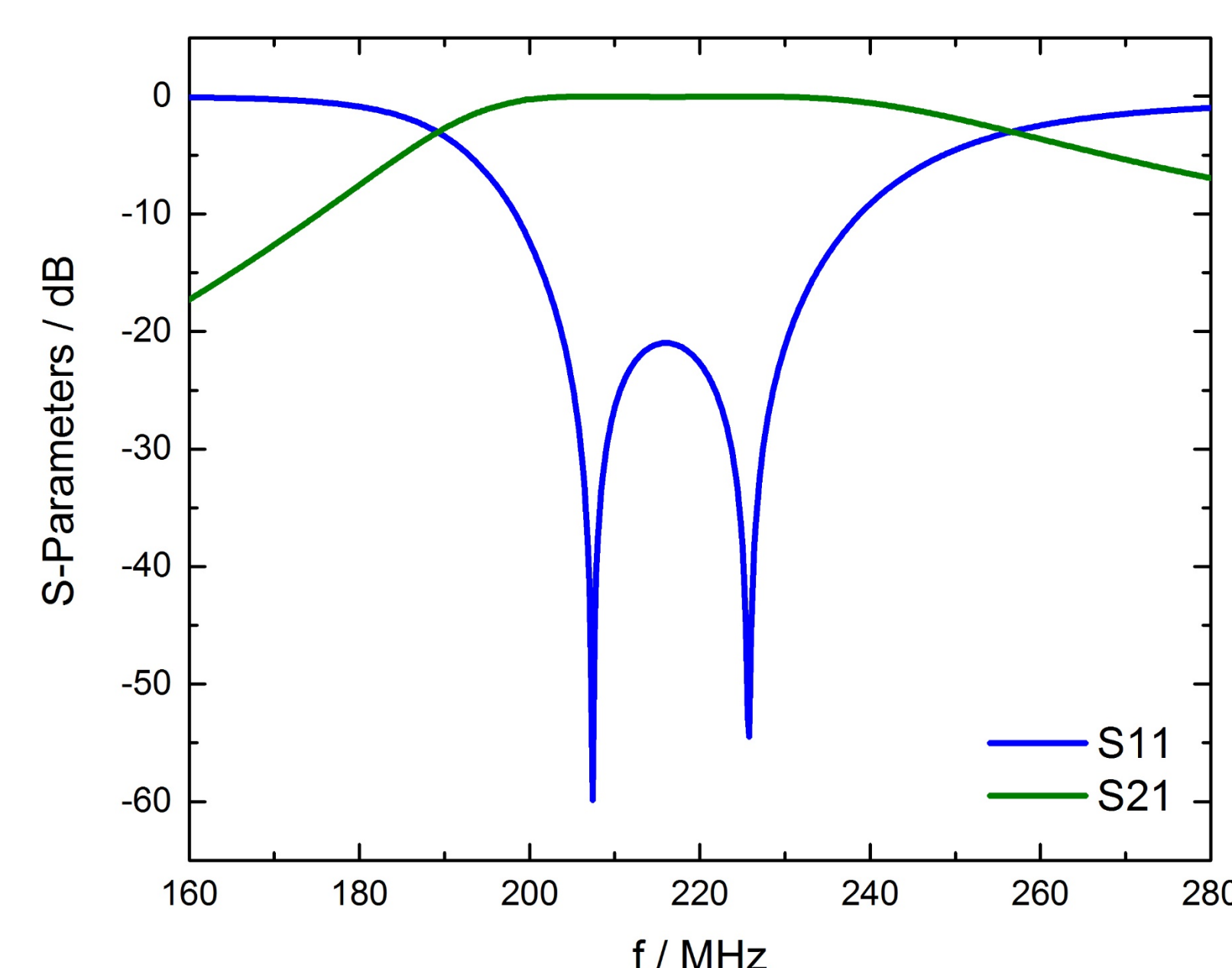


Assembly of the power coupler with the 217 MHz CH-Cavity

For the 217 MHz CH-Cavity proposed for the cw LINAC Demonstrator project a dedicated power coupler test stand is in preparation. A QWR-like cavity will be used to perform conditioning of two couplers simultaneously up to 5 kW cw power.



Proposed power coupler test stand with two couplers.



S-Parameters for the proposed test stand cavity.