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# Design, fabrication and cold-testing of DLA structures

*Tuesday, 20 April 2021 10:15 (30 minutes)*

It has been technically challenging to efficiently couple external radiofrequency (RF) power to cylindrical dielectric-loaded accelerating (DLA) structures, especially when the DLA structure has a high dielectric constant. This talk presents a design, fabrication and cold-testing of a matching section for coupling the RF power from a circular waveguide to an X-band DLA structure with a dielectric constant εr=16.66 and a loss tangent tanδ=3.43×10^(-5). It consists of a very compact dielectric disk with a width of 2.035mm and a tilt angle of 60°, resulting in a broadband coupling at a low RF field which has the potential to survive in the high-power environment. A microscale vacuum gap, caused by metallic clamping between the thin coating and the outer thick copper jacket, is also studied in detail. A choke geometry is added with a TE10-TM01 mode converter to remove the contact issue and bonding joints for assembling two copper parts together. Based on simulation studies, the prototypes of the mode converter with a choke and the DLA structure are fabricated. The bench measurements using a network analyzer has been performed to compare with the simulation studies.

**Presenter:** WEI, Yelong

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