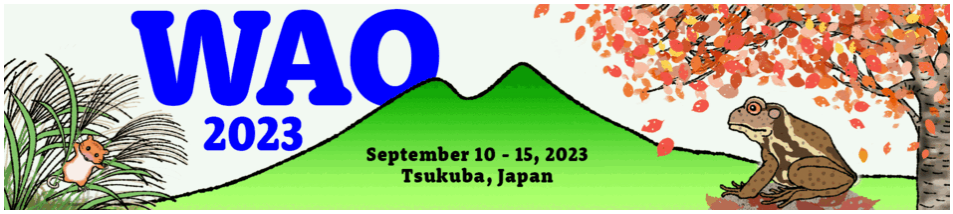

Contribution ID: **60** Type: **not specified**

PO24 - An S-Band Variable Waveguide Power Divider and Combiner for High-Vacuum and High-Power Applications

Tuesday, 12 September 2023 15:10 (20 minutes)

In theory, a 180° hybrid bridge can be used as a variable power divider and combiner. This study focuses on applying the variable power divider and combiner to a high-vacuum and high-power environment, aiming at realizing future applications in particle accelerators. Beginning from theoretical derivation, it reports the design of an S-band variable waveguide power divider and combiner based on a Magic Tee. The simulation results are consistent with those predicted by theory. A prototype of the variable power divider was fabricated for the microwave cold test, and the measurement results verify the variable power division. The power division ratio curve is consistent with the theoretical and simulated curves. The variable power combiner was experimentally verified by combining the Magic Tee and coaxial components. The measurement results are consistent with those of numerical analysis. Simulations evaluating the high-power performance reveal that the matching probe of the Magic Tee and the phase shifting plate tip of the straight waveguide phase shifter could not satisfy the high-power requirement. Thus, the structure of the Magic Tee is improved in the proposed design, and a 3-dB bridge waveguide phase shifter was adopted. The simulation results show qualified performance for high-power applications, and other microwave performance characteristics also show great improvement. The study lays a good foundation for application in future high-vacuum and high-power environments, and some possible important applications are also illustrated.

Presenter: HE, Xiang (IHEP)

Session Classification: Poster / Demo Sessions