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Setup of Goubau Line system for impedance-measurement of vacuum components at the NSRRC

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A setup of in-house made Goubau (G-) Line system for measuring the broadband impedance of vacuum components has been developed at the NSRRC for improving the beam-stability of the Taiwan Photon Source (TPS). A thin copper wire of 0.287 mm in diameter with polyimide-coating ~ 0.02 mm in thickness connects two horn-shape aluminum launchers face-to-face at a distance ~ 1.2 m far in between via two impedance-matching copper tapers welded on both ends of the wire that transports the surface waves through the vacuum duct under test (DUT) allocated at the middle of wire. Measurement of time domain reflection (TDR) for the G-Line has verified the systematic performance of matching the impedance of 50 ohms. A vector network analyzer measures the transmission parameters of S_{21} of the DUT from the G-Line that the longitudinal impedance of DUT can be obtained. Various DUTs of vacuum components e.g. flanges without gasket were measured for inspecting the G-Line performance, besides, the special designed aluminum gaskets with rf-shielding property sealed flanges were also inspected that must feature with ultra-low impedance. The detail design and the test results of the G-Line will be described.

Footnotes

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Paper preparation format

Word

Region represented

Asia

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