

KCS R&D PROGRAM

REPORT

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ML-SCRF Technology Meeting

August 25, 2010

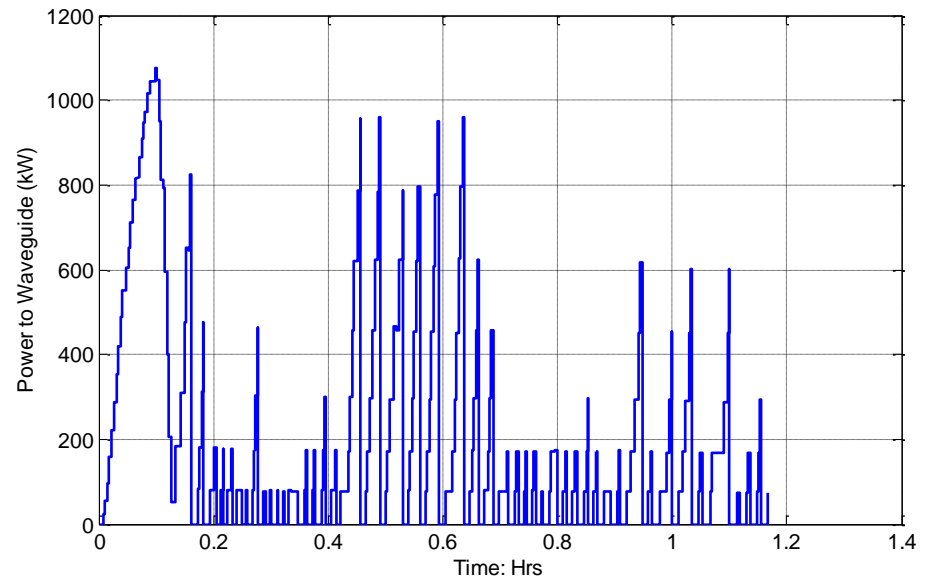
Indium Seal Vacuum Test

We have had a problem with apparent multipacting in a short spool of evacuated aluminum WR650 waveguide between two windows at ~200-300 kW.

Retest after opening (and slight deburring) failed to achieve better than 4×10^{-6} torr, due to a leaky O-ring substituting for a non-reusable helicoflex vacuum gasket. However, the problem remained.

We need to explore this further and determine if the problem might be related to the indium seals we were testing, by which we hope to attach the vacuum windows to the CTO's.

However, if this is a limit due to aluminum multipactor, our plan for using the CTO under vacuum may be in trouble.



Initial CTO Cold Test

The initial cold test of the CTO TE_{01} mode launchers back-to-back yielded reasonable results.

The following plot is data from cold testing of two CTO's back-to-back with shorting caps made deliberately too shallow with the intention of tuning them by shims and remachining.

We are deferring further CTO characterization and tuning of endcaps for transmission.

@1.300 GHz:

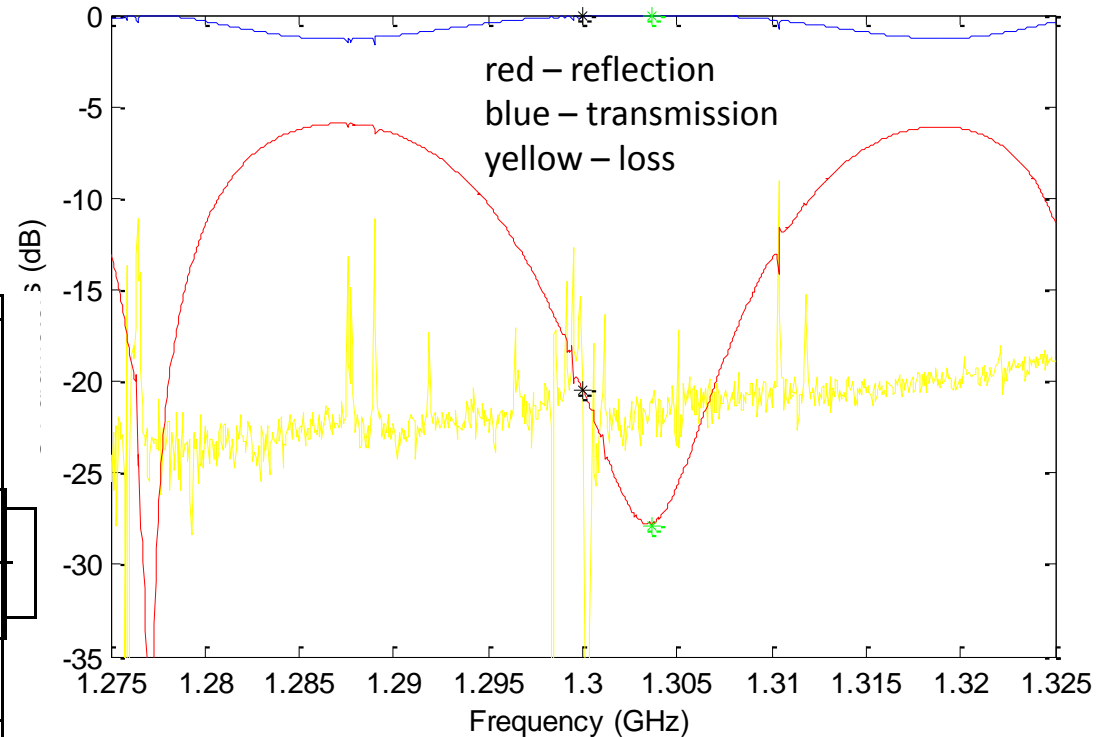
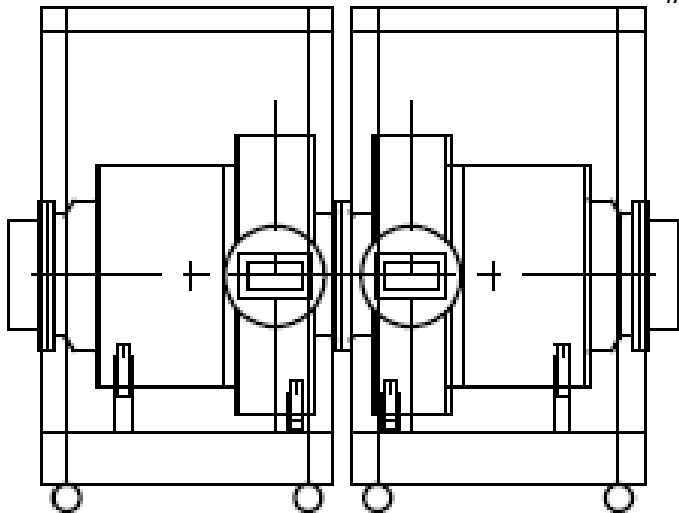
R = -20.43 dB (0.906%)

T = -0.0843 dB (98.08%)

@1.3036 GHz:

R = -27.84 dB (0.164%)

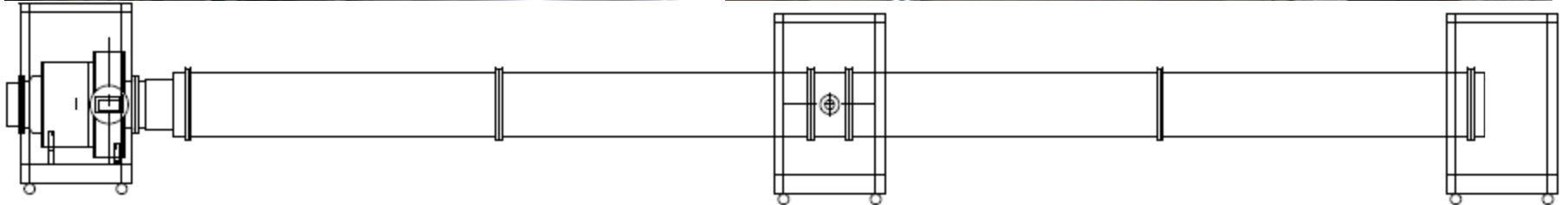
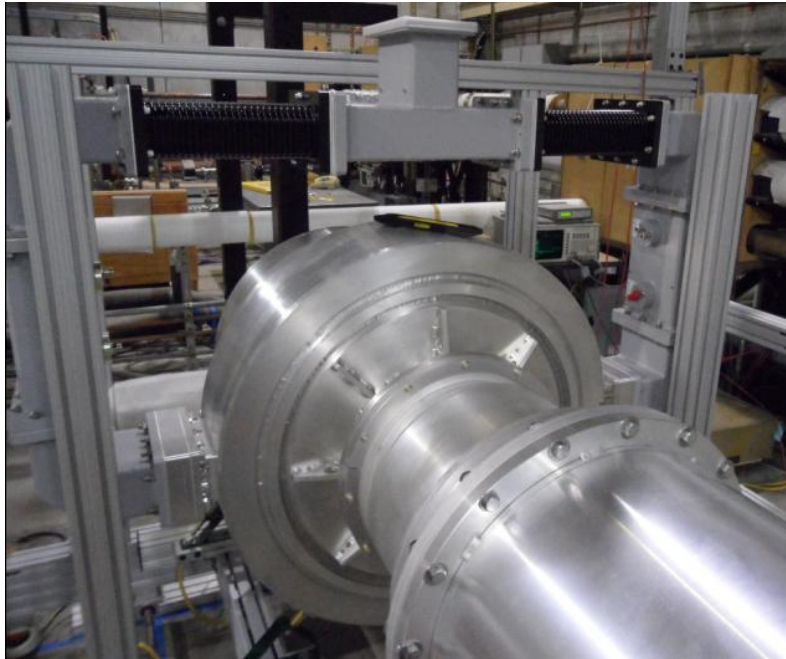
T = -0.0421 dB (99.04%)



Resonant Test Setup

Also skipping transmission tests, we are proceeding directly to a pressurized resonant test of our 10m WC1890 main waveguide with one CTO.

We hope to put power in and generate high fields in the 15 psig pressurized waveguide before BAW. If KCS can work pressurized, there is no need to deal with vacuum problems, and we can eliminate vacuum pumps from the envisioned ILC system.



BAW Preparations

Chris Nantista/Chris Adolphsen:

- KCS design and R&D status,

We will review the KCS concept and the current state of the design configuration for ILC, including global and local HLRF distribution.

We will describe plans for achieving flat gradient with increased cavity gradient spread while achieving flat gradient in each cavity, and present power and heat load calculations.

We will present our R&D program, it's current state, and available test results, including the Marx modulator program and klystron testing.

- Accelerator unit R&D demonstration, (?)

We will present and discuss plans for on-going R&D in the 2011-2012 period.

- Further assignment for the subjects to be discussed,

Chris A. will present work on energy variations and emittance growth along ILC main linacs powered by KCS.