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RF NOTE #11 7/22/77
(J. Riedel)

Things haven't gone well this time. I blame it on the beastly Michigan weather which averaged 90°F and 60% humidity.

The Hi Q Model

Many years ago people said my estimates on time and expenses to build anything should be multiplied by π. However for this model 2π or even 3π seems about right. Tsch tisch. Still, or even so, I believe the model is worth the effort because it will permit us to develop and test all the intricate final control electronics such as amplitude and phase regulators.

It appears that the model will be completely assembled and ready for tests by August 15, 1977. D. Birkett has tested and blessed the 3 modules for controlling the variable condensers in conjunction with the Moog valves and hydraulic actuators. By August 15, hopefully, he will also have developed and constructed the three 10 watt transmitters necessary for testing the model. Also, by August 15, the electronics shop will have completed the fabrication of the dual phase detector module.

J. Riedel plans on being here from August 8 to August 20 to debug the phase detectors, build amplitude detectors and test the model, closing the phase servoe loop. It is expected that this model will remain viable for the next two years as a unit to test and debug other electronics items such as the final phase detectors, the amplitude servoes and other goodies.

The walking short

D. Burleigh has redesigned the walking short using finger stock for the rf joint. He has split the anulus into 9 angular

segments and with a system of ceramic wheels running on the stem and outer conductor, and a spring tensioned flexible radial joint provided for proper operation for nonconcentricity of the pipes of ±1/4". So the only problem remaining seems to be whether the fingers and mating surfaces will not be damaged by galling after 3000 cycles of the 9 ft. possible traversal of the walking short. This is about 5 miles. Now 5 miles in Michigan in July would gall anyone. But since these contacts will be in a "pure" temperature regulated hi vacuum perhaps they stand a chance.

Galling tester

So we will modify the test fixture presently being used to test the bellows associated with the walking short to test the galling of various moving surfaces on various fixed surfaces. The candidates are:

1. silver plated moving contacts on sandpapered copper
2. " " " " on electropolished copper
3. " " + .00002" rhodium contacts on electropolished copper
4. " " + .00002" rhodium contacts on silverplated copper.

The plan is for each of the 4 above candidates to be 1" long flat surfaces with 1" of reciprocating motion in a cryogenically pumped vacuum. It will take a month to walk the 5 miles.

Transmitter

Meanwhile a little thinking and calculating has been done on the transmitter and I was shocked into realizing that 60 mHz is not, scalefactor, twice 30 mHz but 4 times (with a fixed capacity). So the transmitter will not be a box such as on the

present cyclotron, or such as exist at Princeton and Indiana. It will look like a microwave transmitter, a system of cans or pipes. Perhaps it will look like a long FNAL transmitter. Present thinking envisages it as a 3 ft. diam. pipe perhaps 10 ft. long. I need to make some more calculations, but soon we will want to build a wood and copper foil model using a spare 4CW 100,000 and the spare blocking capacitor.