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R. F. Accelerating Cavities for RHIC

G. Cottingham

January 1987

Collider Accelerator Department
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U.S. Department of Energy
USDOE Office of Science (SC)

DISCLAIMER

AD/RHIC-AP-43

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BROOKHAVEN NATIONAL LABORATORY

MEMORANDUM

DATE: January 16, 1987

TO: E. B. Forsyth

FROM: J. G. Cottingham J.G.C.

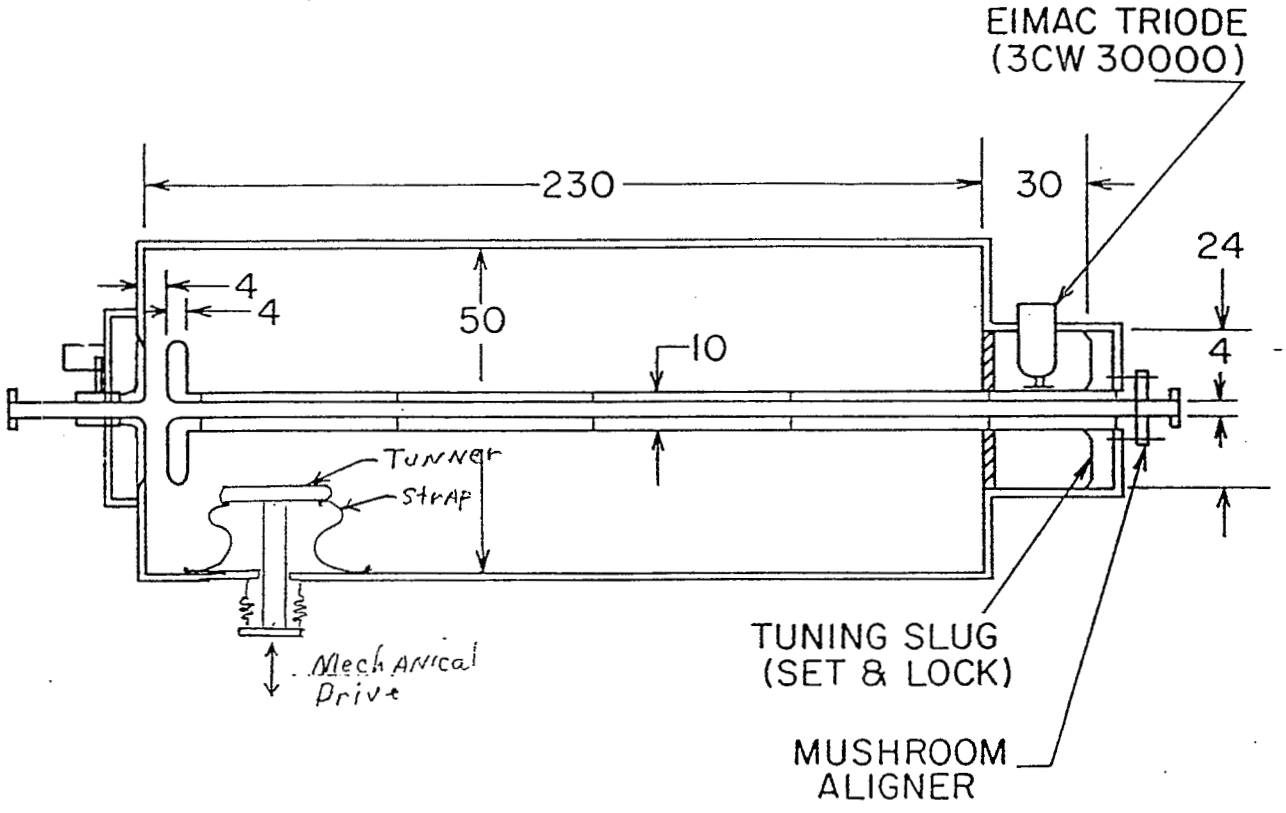
SUBJECT: R.F. Accelerating Cavities for RHIC

I have reviewed the beam transfer, capture and accelerating r.f. requirements for RHIC both for protons and for heavy ions and these results are contained in a RHIC technical note now being reproduced.

I have also reviewed the high voltage r. f. cavity design described by M. Puglisi in RHIC Technical Note No. 6. As you know this cavity design was the basis for the design presented in the RHIC Conceptual Design where it was modified to include a frequency tunning feature, (see page 241). The design is sound with one exception. I don't like using the accelerating gap spacing as a means of adjusting the frequency. I believe that stress flexture and motion should be avoided in this high gradient region. Instead I would suggest a "side" tunning plunger which I believe is more conventional. I have sketched a design of this type, (see attached Fig. 1).

This plunger is mechanically positioned by an external mechanism working through a bellows to accomplish the desired tunning. The electrical connection to the plunger is accomplished by flexible copper straps. Sliding r.f. joints in a vacuum is in my view a no-no. The required motion for normal operation is small, see attached tunning-position curve, but the full range requested in the Conceptual Design is available.

cc: H. Hahn ✓


EIMAC TRIODE
(3CW 30000)
230
30
24
4
4
50
10
4
Tunner
Strap
Mechanical
Drive
TUNING SLUG
(SET & LOCK)
MUSHROOM
ALIGNER

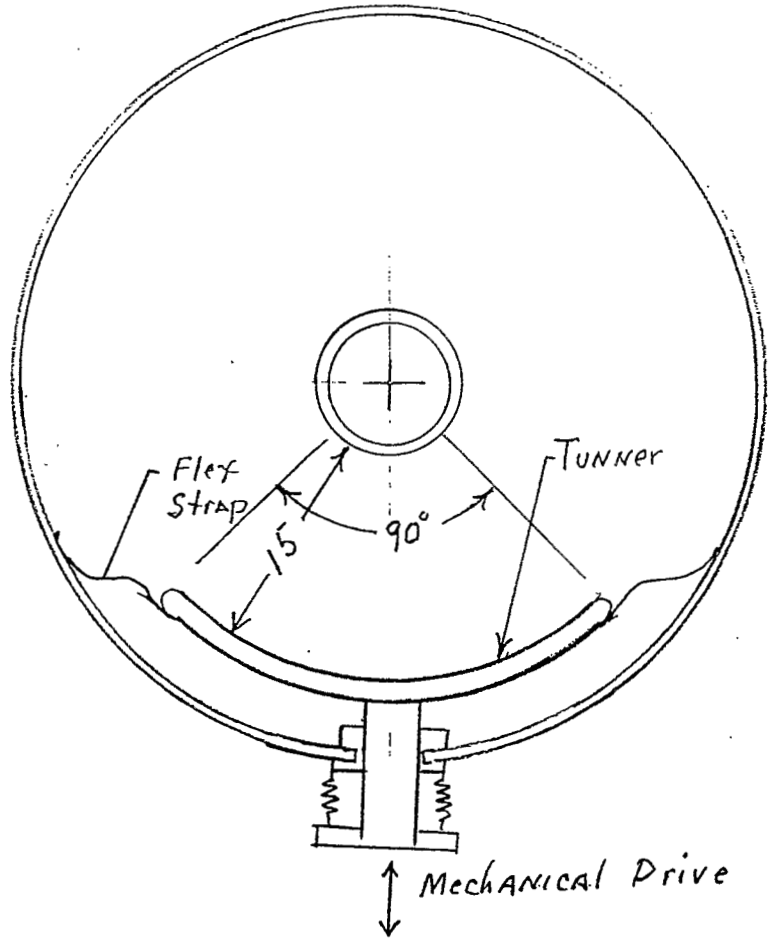

Flex
Strap
15
90°
Tunner
Mechanical Drive

Fig 1

SQUARE 5 X 5 TO THE HALF INCH AS-0811 -GO