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## R. F. Accelerating Cavities for RHIC

G. Cottingham

January 1987

Collider Accelerator Department  
**Brookhaven National Laboratory**

**U.S. Department of Energy**

USDOE Office of Science (SC)

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AD/RHIC-AP-43

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January 16, 1987

BROOKHAVEN NATIONAL LABORATORY

MEMORANDUM

DATE: January 16, 1987  
TO: E. B. Forsyth  
FROM: J. G. Cottingham *JGC*  
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 tuning 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 flexure and motion should be avoided in this high gradient region. Instead I would suggest a "side" tuning 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 tuning. 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 tuning-position curve, but the full range requested in the Conceptual Design is available.

cc: H. Hahn ✓

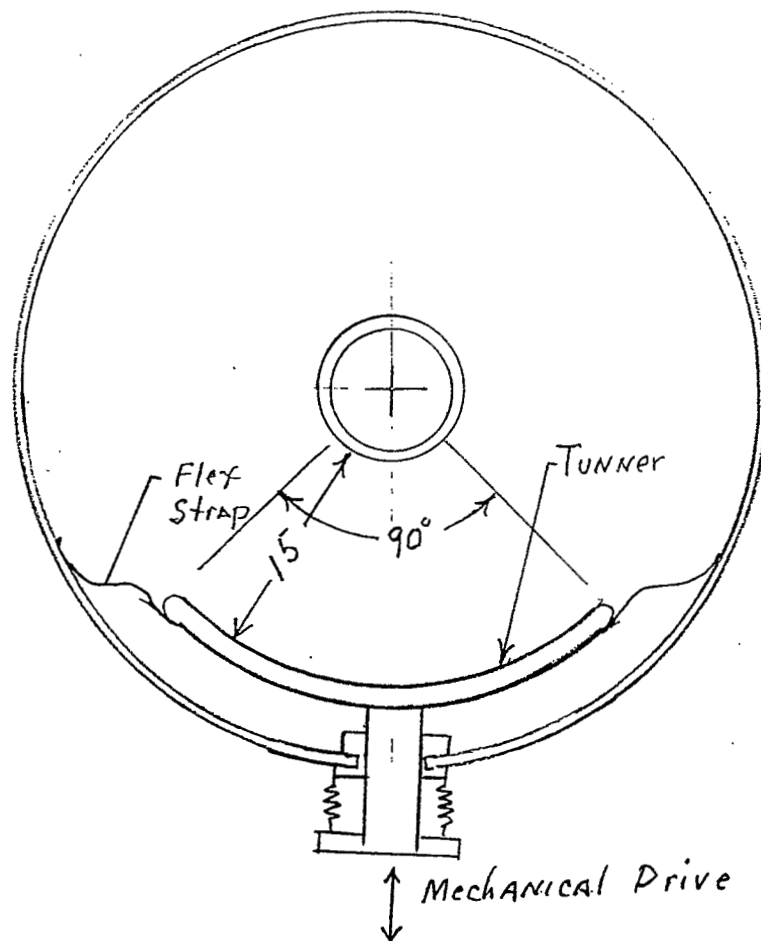
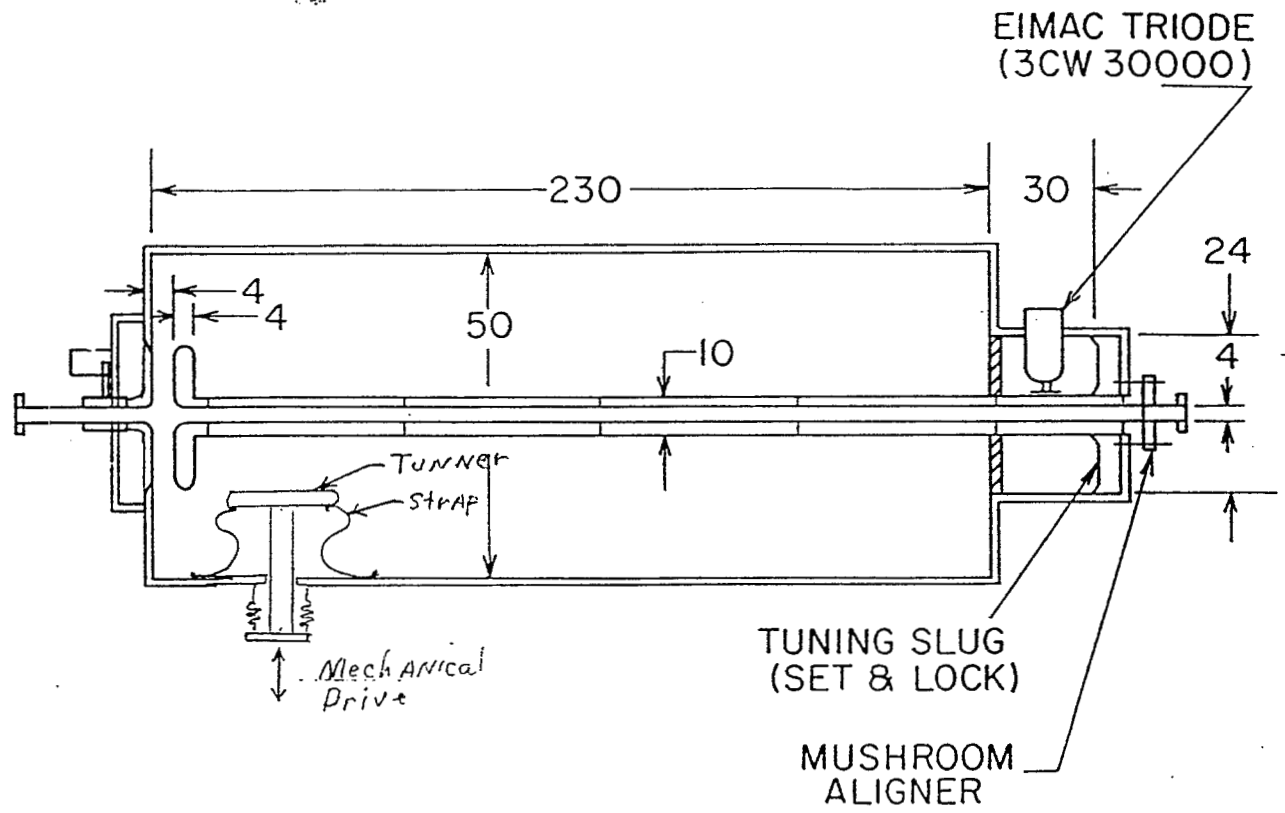


Fig 1

