

## 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)

Notice: This technical note has been authored by employees of Brookhaven Science Associates, LLC under Contract No. DE-AC02-76CH00016 with the U.S. Department of Energy. The publisher by accepting the technical note for publication acknowledges that the United States Government retains a non-exclusive, paid-up, irrevocable, world-wide license to publish or reproduce the published form of this technical note, or allow others to do so, for United States Government purposes.

## **DISCLAIMER**

This report was prepared as an account of work sponsored by an agency of the United States Government. Neither the United States Government nor any agency thereof, nor any of their employees, nor any of their contractors, subcontractors, or their employees, makes any warranty, express or implied, or assumes any legal liability or responsibility for the accuracy, completeness, or any third party's use or the results of such use of any information, apparatus, product, or process disclosed, or represents that its use would not infringe privately owned rights. Reference herein to any specific commercial product, process, or service by trade name, trademark, manufacturer, or otherwise, does not necessarily constitute or imply its endorsement, recommendation, or favoring by the United States Government or any agency thereof or its contractors or subcontractors. The views and opinions of authors expressed herein do not necessarily state or reflect those of the United States Government or any agency thereof.

AD/RHIC-AP-43

R.F. Accelerating Cavities for RHIC

G. Cottingham

BNL

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 ✓

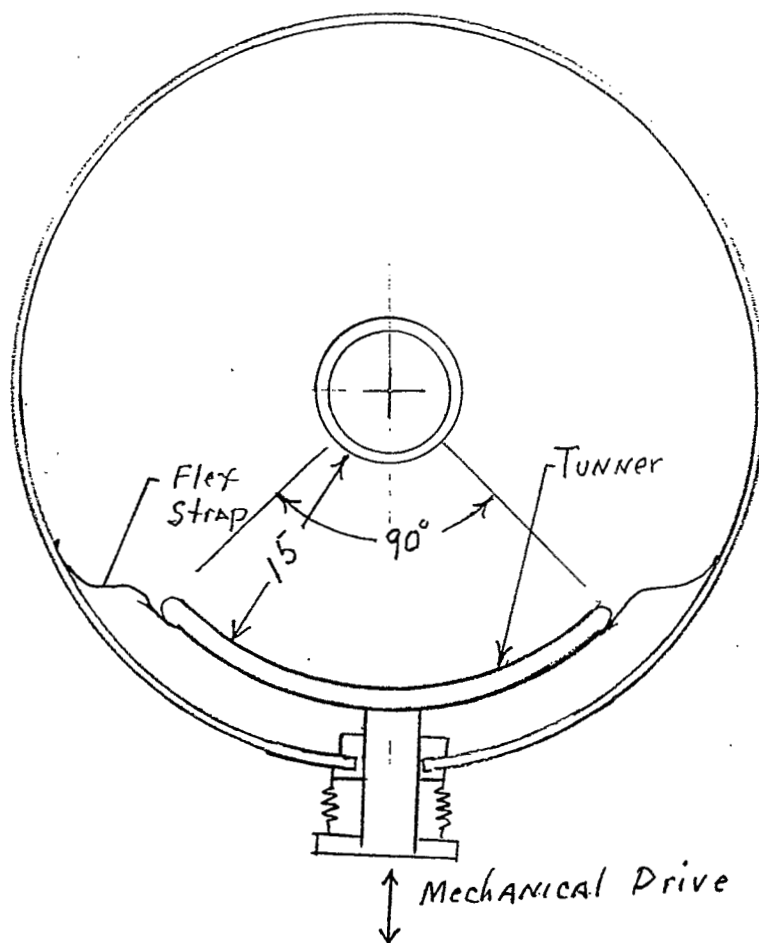
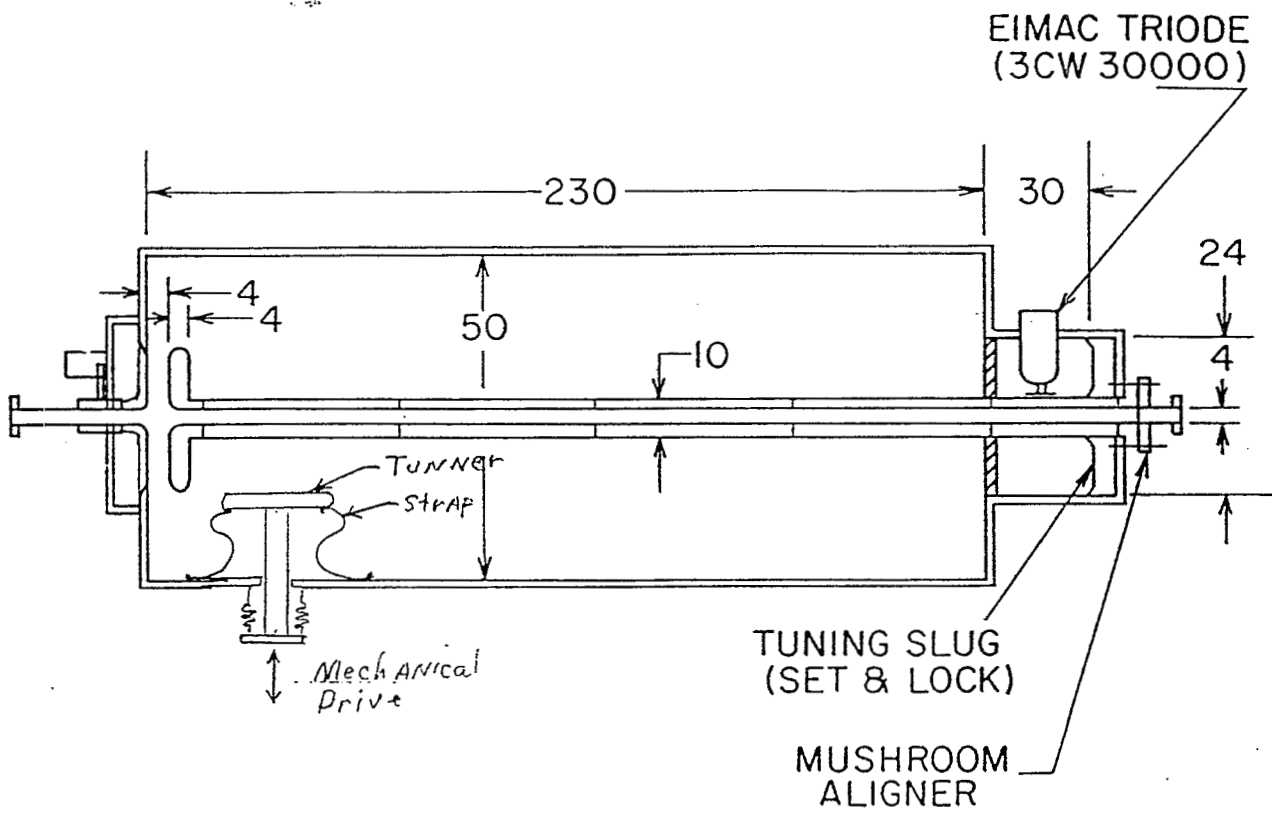


Fig 1

