Date: April 15, 2004

Subj: **APS drawings 25030101-00017 PAR stripline chamber S-4**

25030101-100001 PAR spare chamber SP-4 (spool pc)

Spare status: **Spare S-4 chamber: vacuum certified and stored at bldg 382**
Spare chamber SP-4: design complete, beam tube fabrication in process

Fig. 1: Storage location of S-2 chamber in 382 (open cabinets on mezzanine)

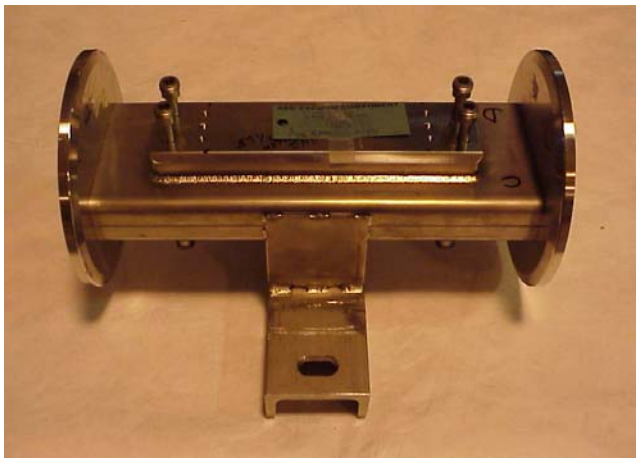

Fig. 2: Spare S-4 chamber

Further details:

- **General information about stripline BPM spares**

  "Stripline" is the term given to beam position monitors (BPM's) used in PAR. One of the important features of all striplines is ceramic feedthroughs which carry the electrical signal from the stripline BPM to relevant instrumentation. The ceramic material is used as the feedthrough vacuum seal and electrical insulator for the signal. These feedthroughs are very sensitive to mechanical impact and are easily cracked. When a failure occurs, the result is often a vacuum leak.

  The striplines have been built as integral parts of vacuum chambers in PAR. This was dictated by the generally limited space available between magnets. For this reason, stripline housings are all made on Inconel 625 (non-magnetic). In the case of the S-4 chamber, however, there was sufficient space to install it external to any magnets.

  A few stripline ceramics have failed in fabrication, but none has been known to fail in the ring as yet.

  Striplines are relatively difficult to make because they require electron beam welding methods as well as close tolerances. The level of difficulty of fabrication and the use of Inconel material makes stripline fabrication costs very high.

The S-4 stripline is used as a “tuner” or “pinger” to excite the beam and notice a corresponding response. For this reason, there are only two of these units. One unit is part of the S-4 chamber. The other unit is part of the S-6 chamber. Neither of these particular striplines is critical to operation of the beam.

- **S-4 Stripline Chamber (APS drawing 25030101-00017)**

This chamber is installed in PAR in one place as shown in Fig. 3. It is provided with a stripline (tuner) BPM only.

During the original fabrication/installation of PAR, one identical spare S-4 chamber was fabricated. This chamber is stored at bldg 382 and is vacuum certified. It may be used as a direct replacement.

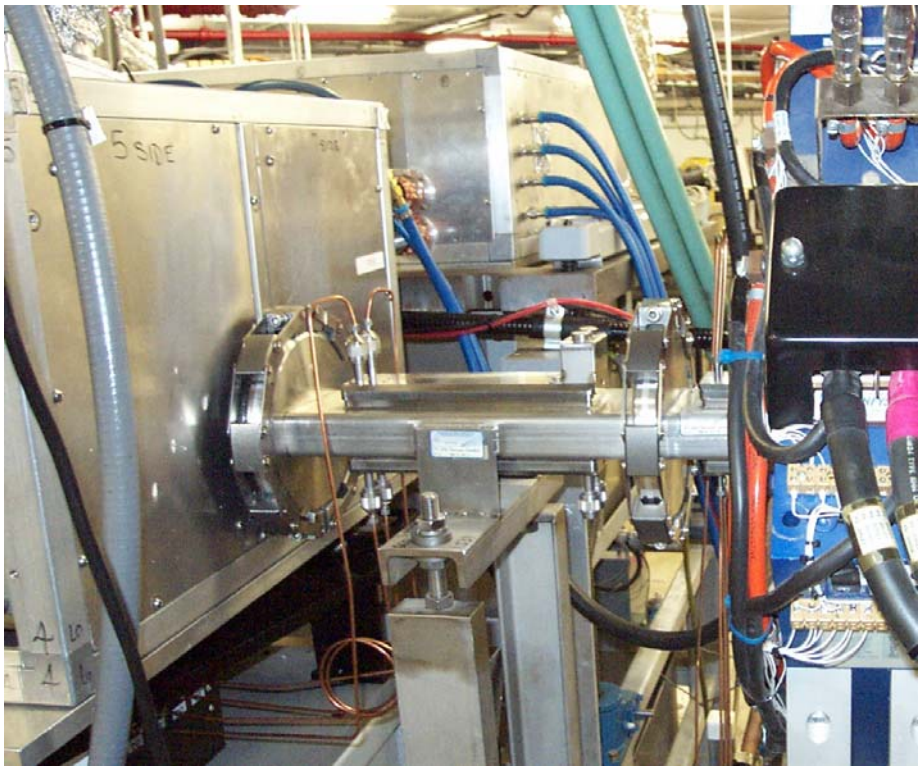

Fig. 3: S-4 chamber installed in PAR.

- **SP-4 Spare Chamber (APS drawing 25030101-100001)**

Since the ceramic feedthroughs are so sensitive to breakage, a spool piece replacement spare is being fabricated. This chamber is tagged SP-4 and is detailed on APS drawing **25030101-100001.**