

S-BPM Support Issues to be discussed with LAPP and KNU

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3/27/08

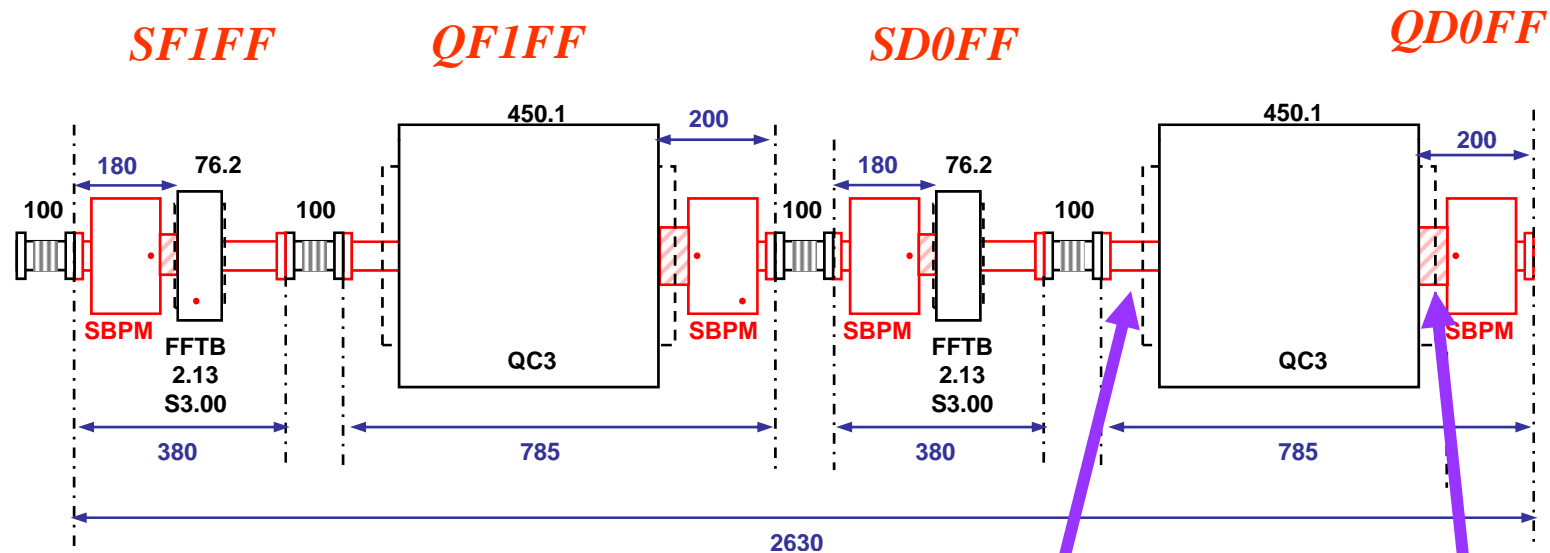
Holding up the S-BPMs in the ATF2 FD magnets

- In an e-mail last week, Dr Jeremie wrote about the supports for the S-BPMs in the FD magnets:
 - “In principle, we would be able to do the supports but we have some additional questions”
- I tried to answer some of her questions in my e-mail reply, and in these slides I show some drawings and photos to clarify some points and note where decisions still need to be made.

How to Support S-BPM from QD0, QF1?

Final Doublet Table Configuration

(Okugi's presentation, December meeting)

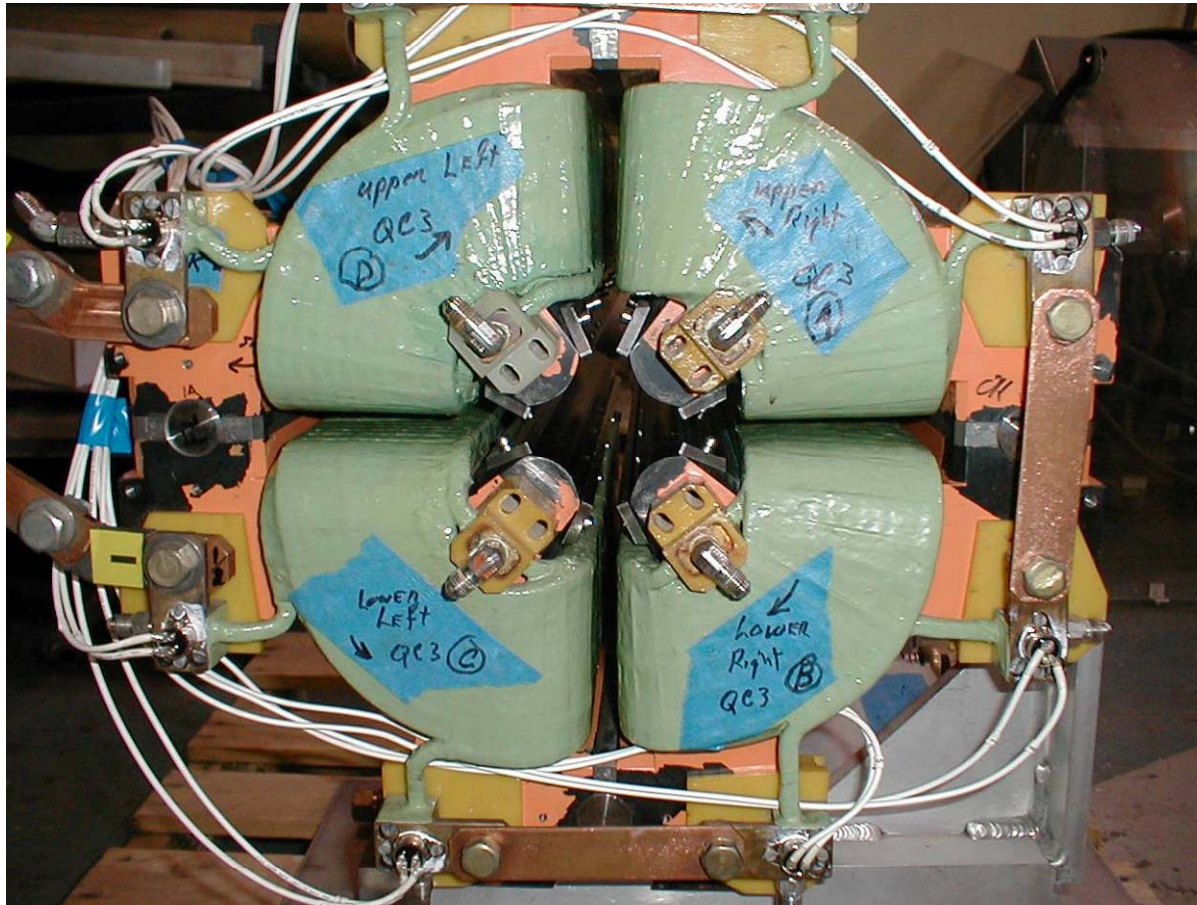


Because S-BPM must move with quad, it must be supported from quad. There is no plate between quad magnet & mover. There IS a plate between sextupole and its mover.

BPM must be supported here. (Cantilevered)

No space here due to water/electrical connections.

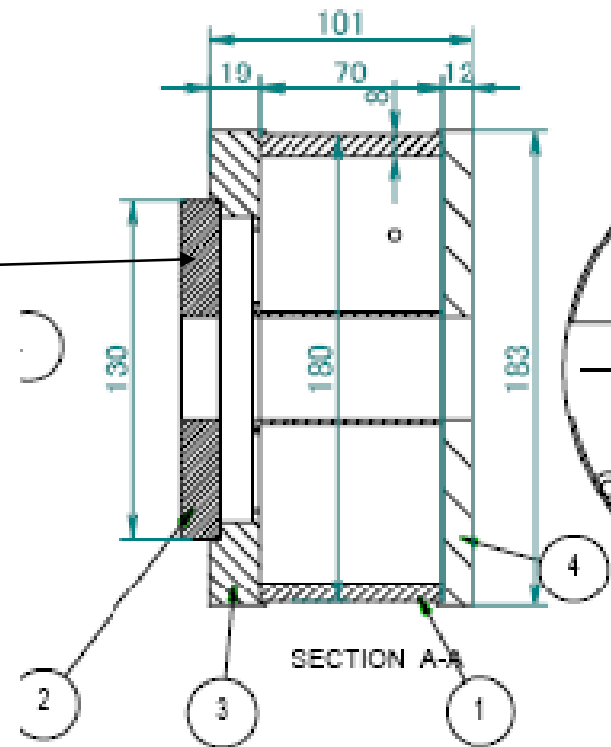
The S-BPMs are placed downstream of the quads and upstream of the sextupoles.



This is the water & power connections end of a FD quad – no room for the BPM or any supporting device

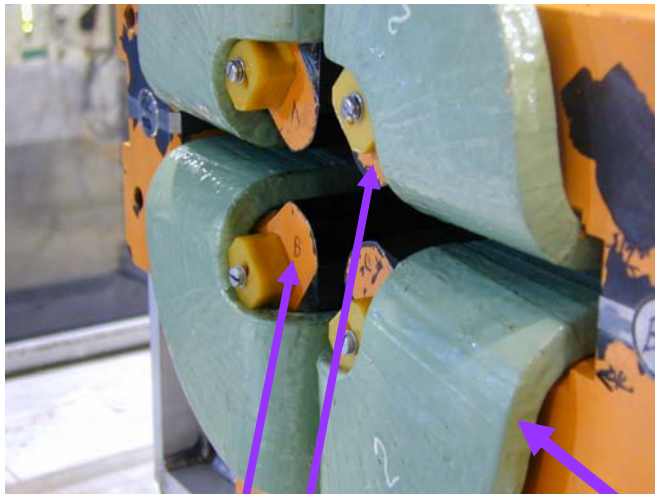
Dimensions of KNU's S-BPM, from their recent e-mail

This "left frame" section is too large to touch the quad poletips directly

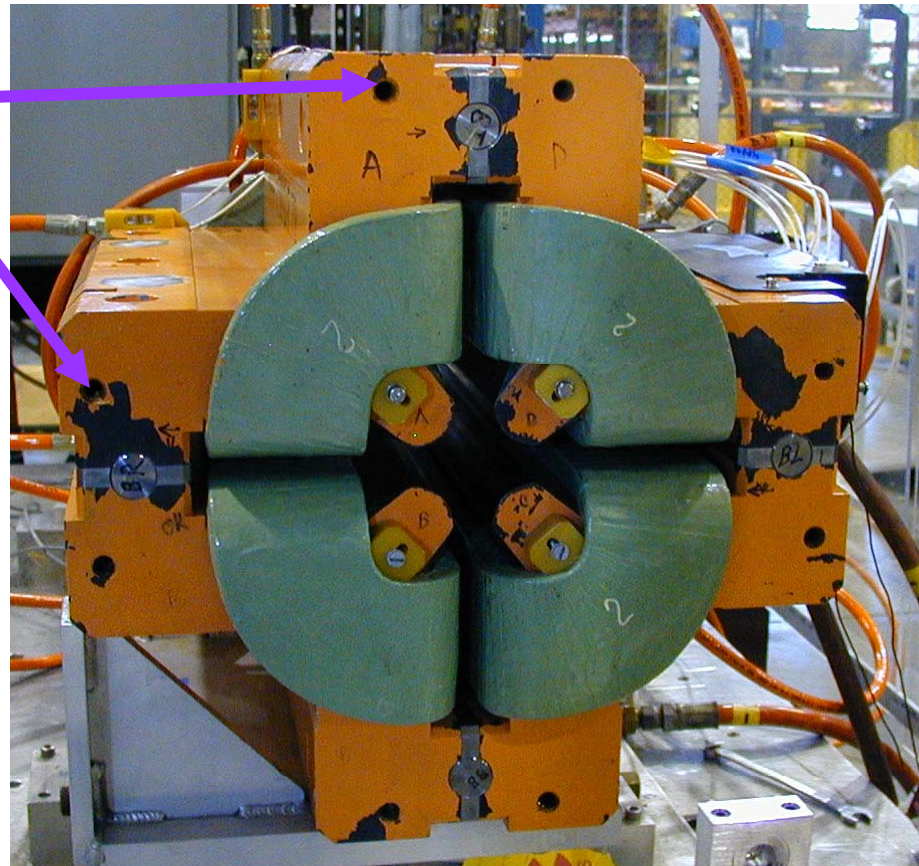


S-BPM Support Attachment to Quad-HOW?

Can use tapped M12 holes on end face of magnet to secure S-BPM support. Are 8 available. SLAC can provide drawing showing 8 holes.



Clear space here is 100mm OD S-BPM Cavity "left frame" is 130mm OD. So will need adapter to offset cavity and maintain contact/alignment with poletip face.

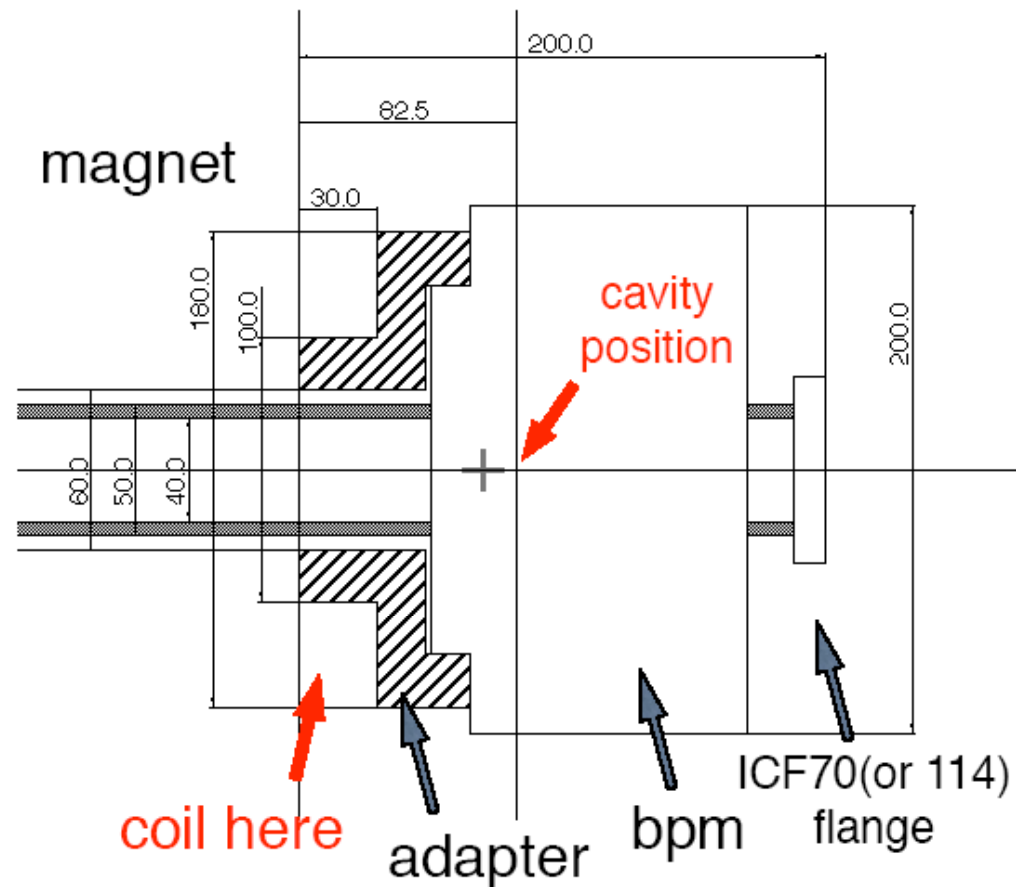


Support must clear coils which protrude (~1") past end face (SLAC provide drawing)

ADAPTER on the end of the cavity part of the BPM IS VERY IMPORTANT (dimensions have changed since this drawing. Now: Magnet bore is 50mm; OD of BPM pipe is 48mm, ID is 40mm)

S-band BPM dimensions

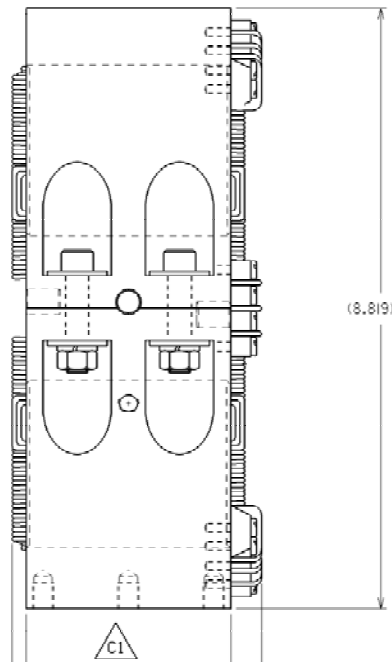
- From Alexei Liapine's latest design, I came up with the outer shape of the S-band BPM
- Beam aperture was increased and longitudinal size was reduced in this model compared with ESA bpm.
- Longitudinal size from the magnet's surface to the flange end is 200mm.
- Transverse diameter at the cavity main body is 200mm.
- I tried to make a strange shaped adapter to avoid interference with the magnet's coil.
- Actual position to sense the beam position is 82.5mm from the magnet's surface



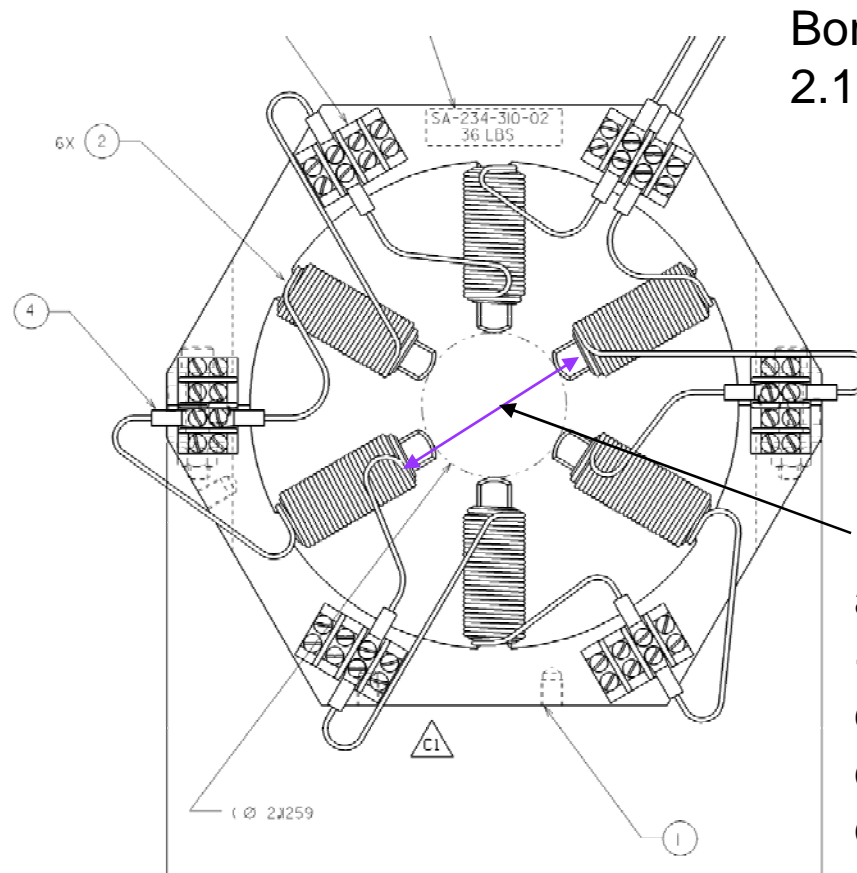
These issues must be addressed by the support designer, in consultation with Spencer & Amann at SLAC and KNU BPM designers

- When S-BPM is installed, magnet must be split in two halves. When re-assembled, need to check poletip closest approach and bore dimensions to ensure v. small multipoles.
- How to do this when S-BPM blocks access to poletips at one end?
- How to keep the S-BPM in the center of the magnet bore?
 - The BPM beampipe is smaller than the bore
- How to finely align S-BPM to magnetic center of quad?
- How to secure adapter to S-BPM? (Set screws, screws or holes in S-BPM body.)

Dimensions of FD sextupoles; how to make a solid contact between S-BPM and these sextupoles?



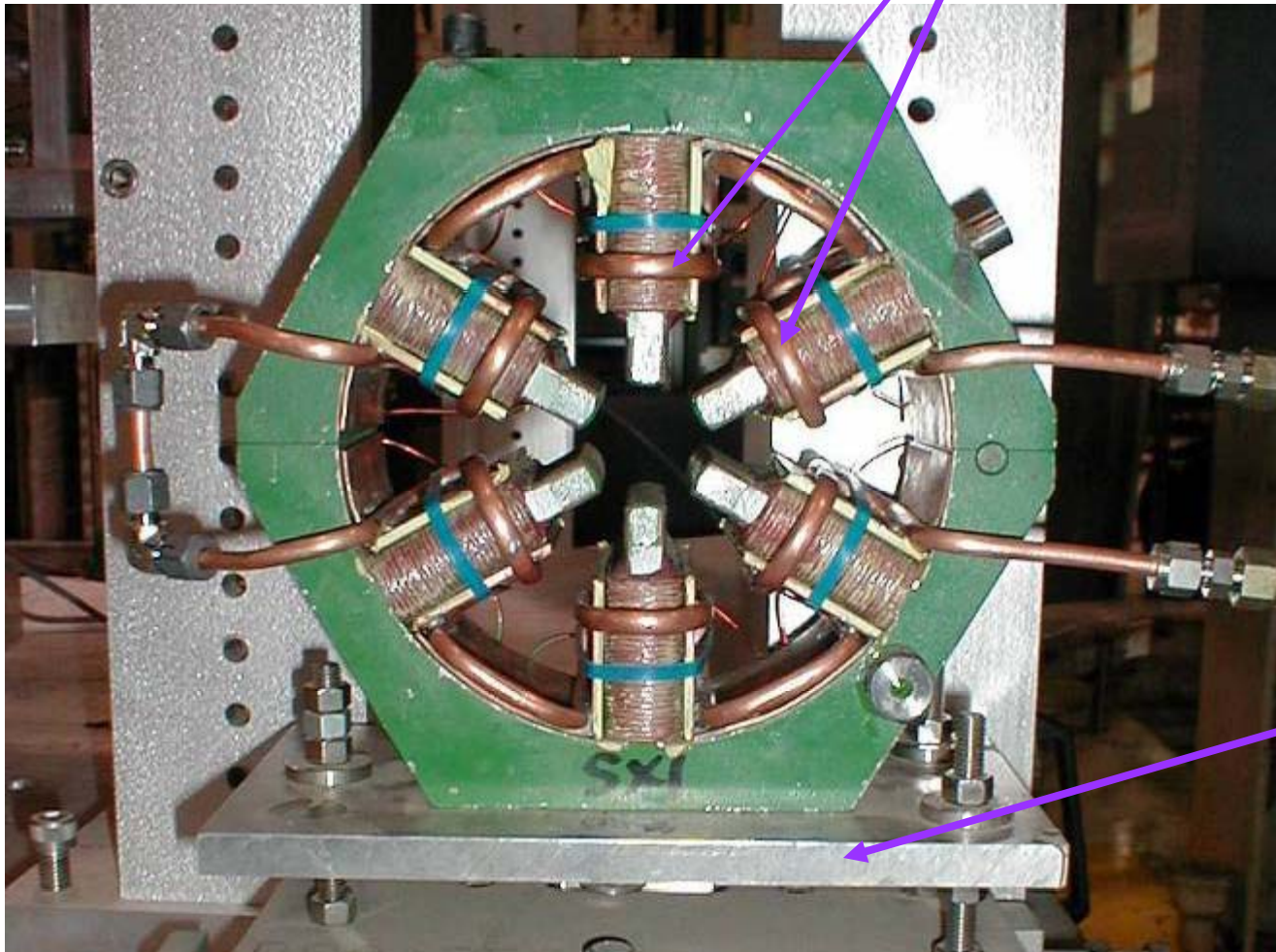
Solid steel core, 3" long = 76.2mm. Coils stick out a little, plus- see next slide.



Bore diameter:
2.1259" = 54mm

Free space for an adapter is ~75mm in diameter [different from quad's space]

Need to accommodate the coils' ends and the copper pipe cooling circuit that sticks out



SLAC can provide a drawing of this sextupole with its cooling circuit.

There will be a plate similar to this directly under the FD sextupoles, can support the S-BPM from this plate.