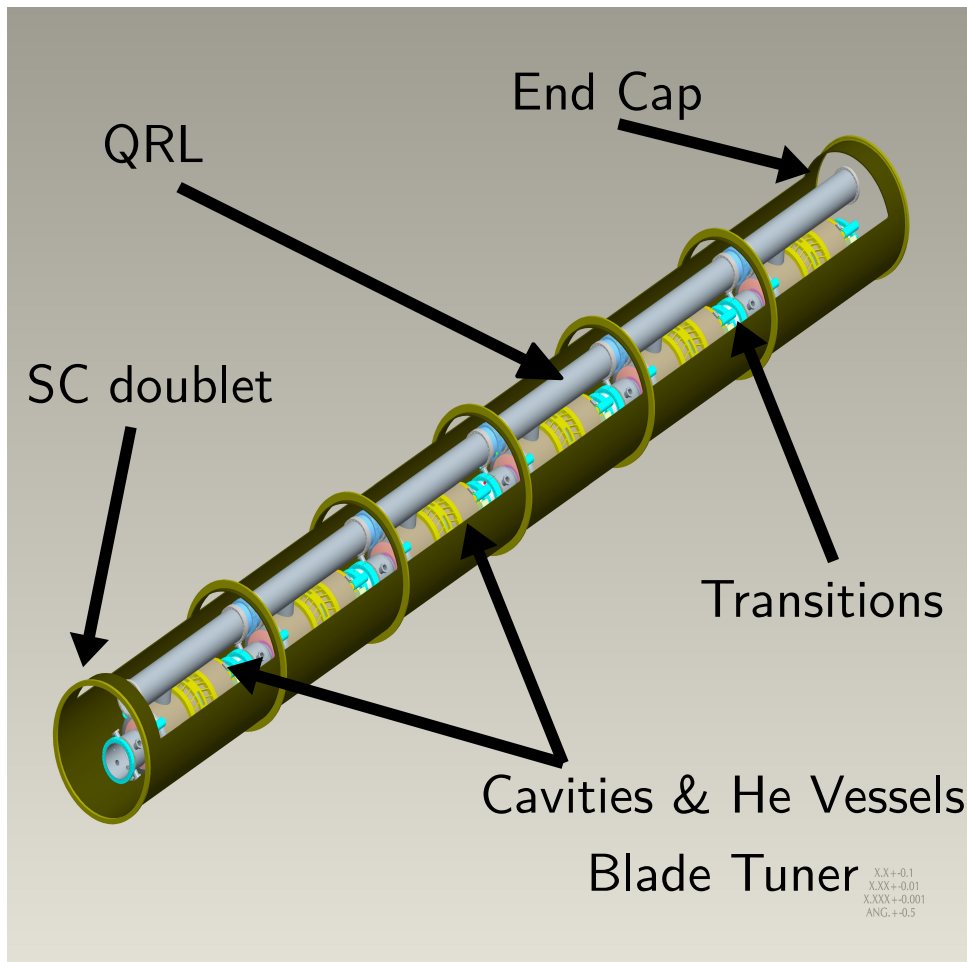


EXPERIENCE FROM BNL

I. BEN-ZVI, R. CALAGA, G. MAHLER, G. MCINTYRE, S. SEBERG, J. TUOZOLLO,
R. THAN, S. PLATE, NOV 10, 2009

- Preliminary 704 cryomodule
- Access ports & operational view
- Impact of cavity failures on sectorization
- Future work

PRELIMINARY CRYOMODULE



String assembly of multiple cavities.
Heat shielding and top covers removed
for clarity.

Breakdown of the eRHIC Cryomodule

N cavities = 6 (but can 4-8)

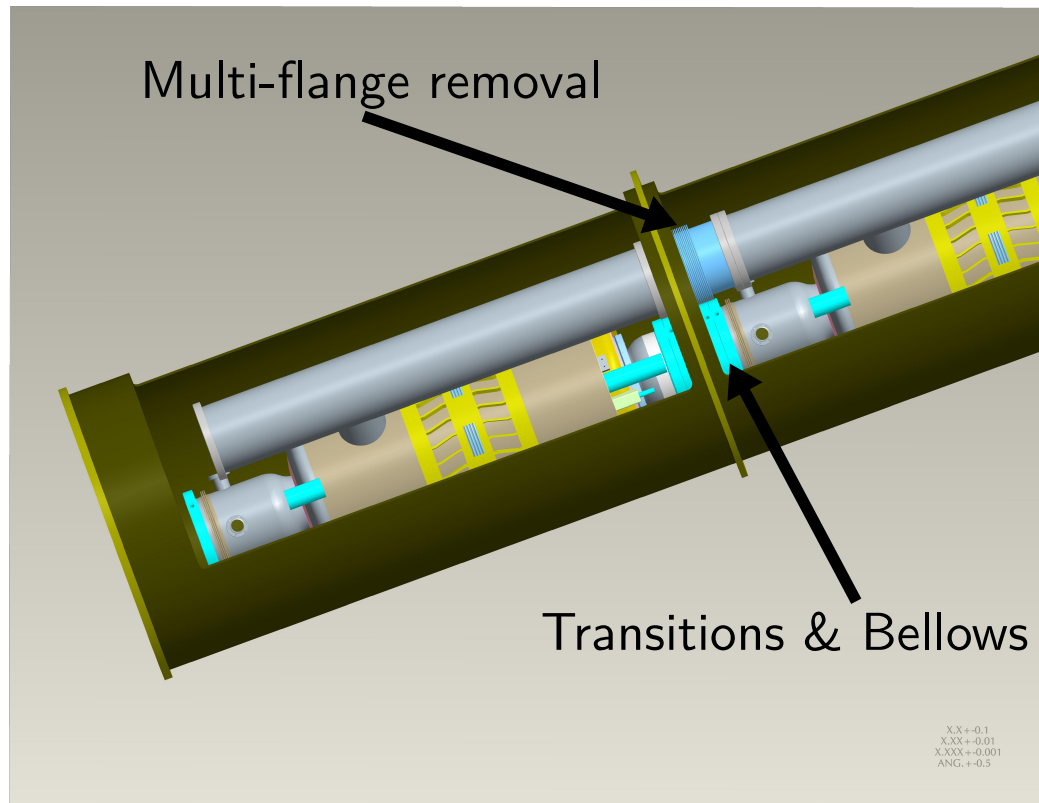
Module length = 9.6 m

L period = 10.6 m

$E_{\text{acc}} = 18.0 \text{ MV/m}$

$dE/ds = 10.2 \text{ MeV/m}$

CRYOMODULE TOP VIEW



- Top hatch (removal & installation)
- Welded or flanged
- Simpler access to critical parts
- Possibility of motors outside the cryogenic environment
- Easy connection to HOM loops, possibility of removal
- Cavity for maintenance (rather than a whole cryomodule), compatible with initial installation of a complete multi-cavity cryomodule.

eRHIC operation

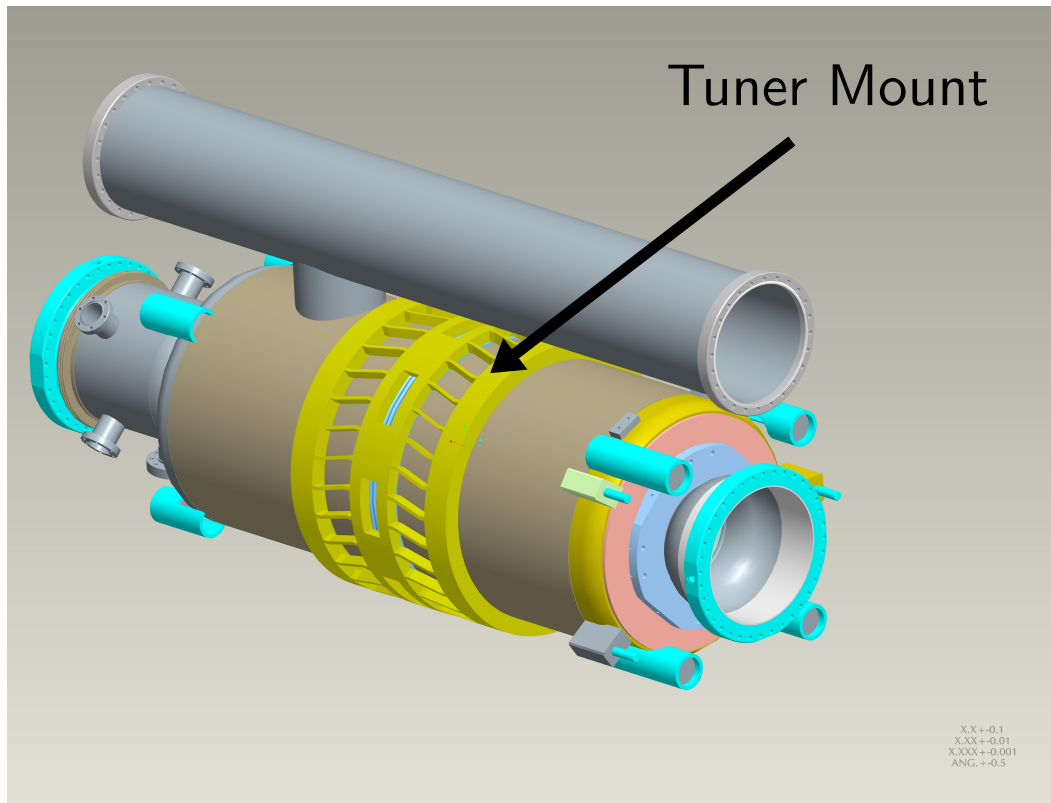
10-20 GeV

Multipass, high current ERL

Sectorization “small”

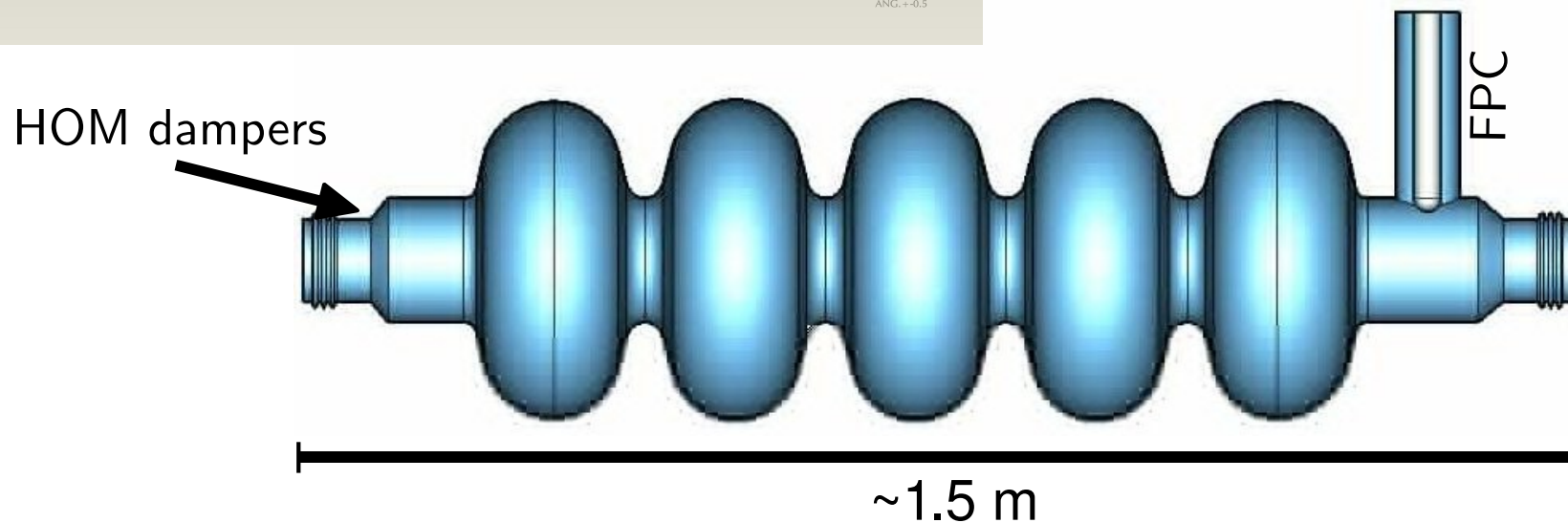
Dynamic losses may dominate

CAVITY TUNING

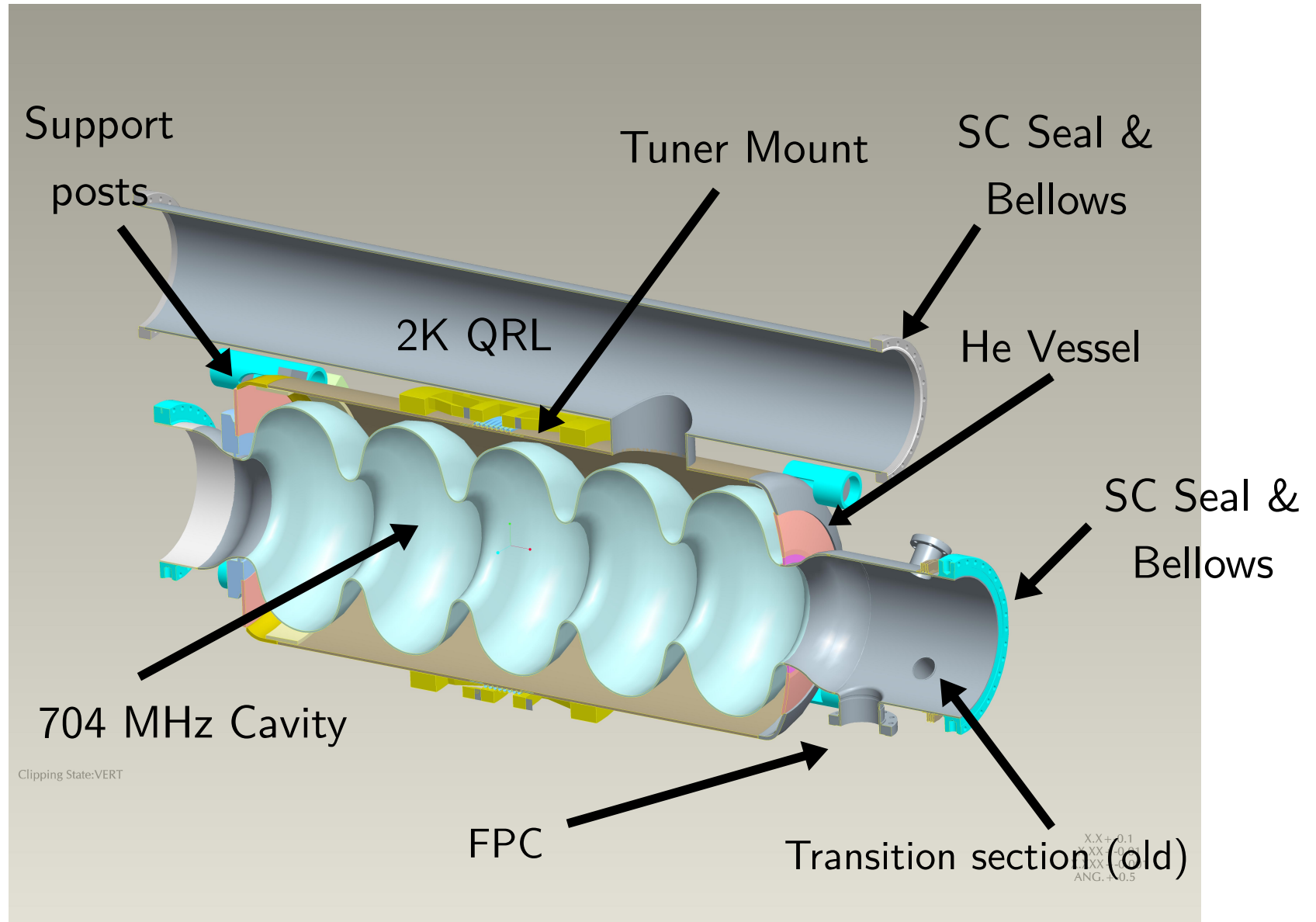


“Blade” type tuning assembly currently being considered.

Exact tuning mechanism maybe effected by HOM damping scheme



CAVITY CROSS SECTION



** Missing 5K, 80K forward-return lines, support, alignment etc...

IMPACT OF CAVITY REMOVAL

Non-trivial procedure (several SC flanges)

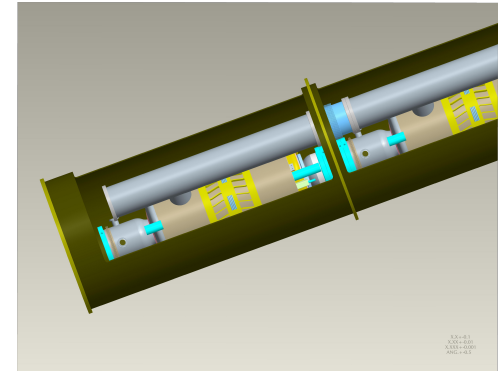
Both cavity and insulating vacuum is not preserved.

All cavity connections must be removed.

Tuner will remain with individual cavity

Approximate time ~2-3 weeks downtime.

Number of cavities in a cryomodule doesn't affect removal procedure



LOTS OF FUTURE WORK

- Complete mechanical design with FPC & HOM damping scheme

 - Detailed thermal & magnetic shielding

 - All cryogenic circuits (2K, 5K, 80K)

- Finalize tuner concept (He vessel fitted ?)

- Mechanical analysis

 - Cavity-He vessel and FPC

 - Cavity string modes & anchoring

 - He vibrations and QRL issues

- Thermal analysis

 - Static & dynamic heat loads (cavity, coupler, HOMs)

 - Transition section cryogenic losses

 - Cooling loops (2K, 5K (?), 80K)