



Measurements Q external using dummy couplers.

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External Q (coupling) of LB and HB couplers depends on:

A. Coupler properties:

1. Reflection (SWR)
2. Antenna orientation, length, displacement (banding, tilting)
3. Flange backlash and tilting

B. Cavity properties:

1. Coupler port position, height and tilting
2. Particular sizes of port (rounding radii)
3. Cavity field flatness

C. Distribution line properties:

1. Reflection inside distribution line
2. Reflection from circulator (amplifier)

Q external depends on a lot of parameters.

We can adjust Q_{ext} by changing the orientation of coupler antenna (tip).

To get 'ideal' coupling we have to do adjusting taking in to account all parameters. But it is not possible or practical.

C1 and C2 - not possible, we cannot open cavity to do adjustment in tunnel.

Cavity is assembled in clean room.

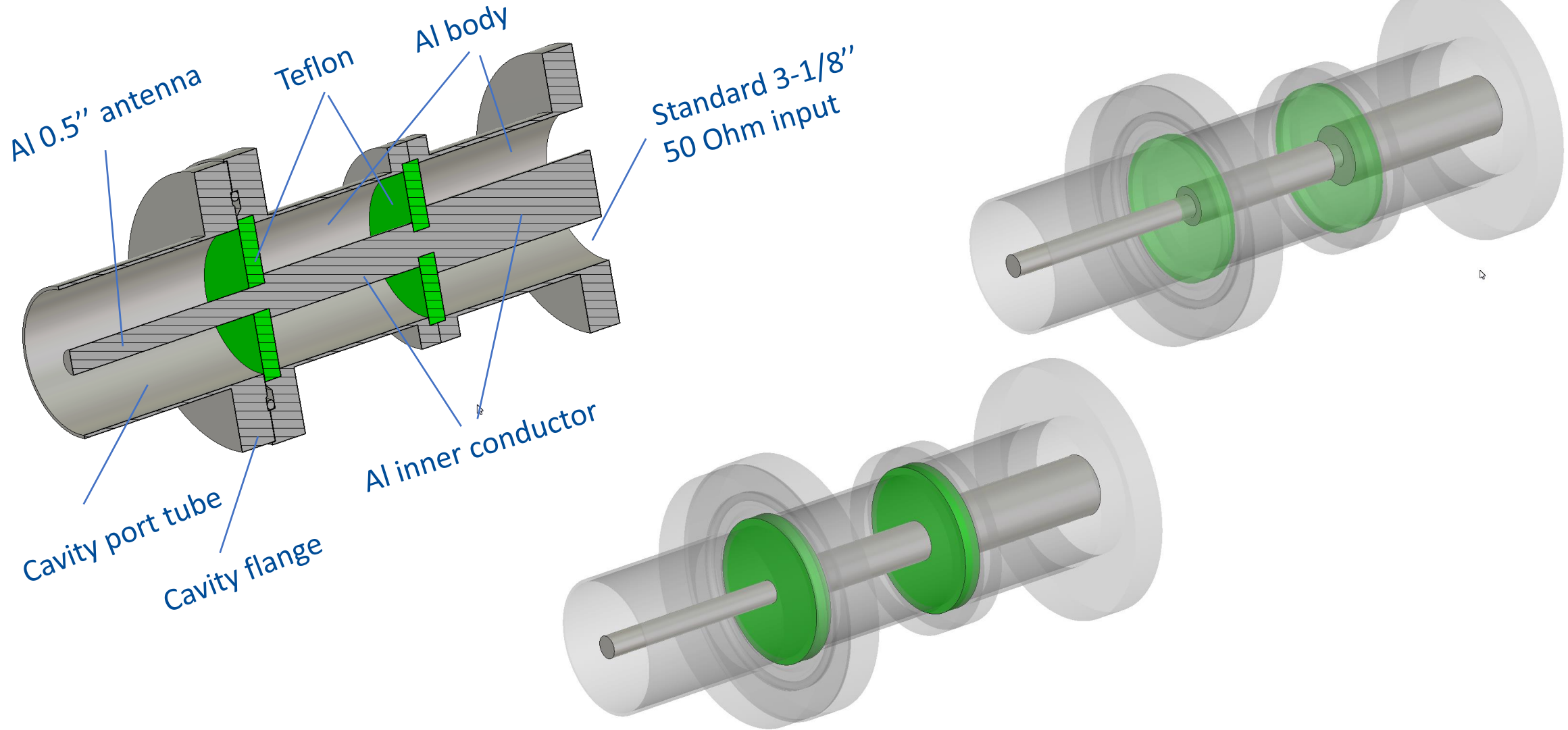
A1 – is not practical. Whole coupler is too bulky, it requires complicated tools. If coupler is clean, operation has to be perform in clean room.

A1, A2, A3 – probably not practical from particle generation in clean room.

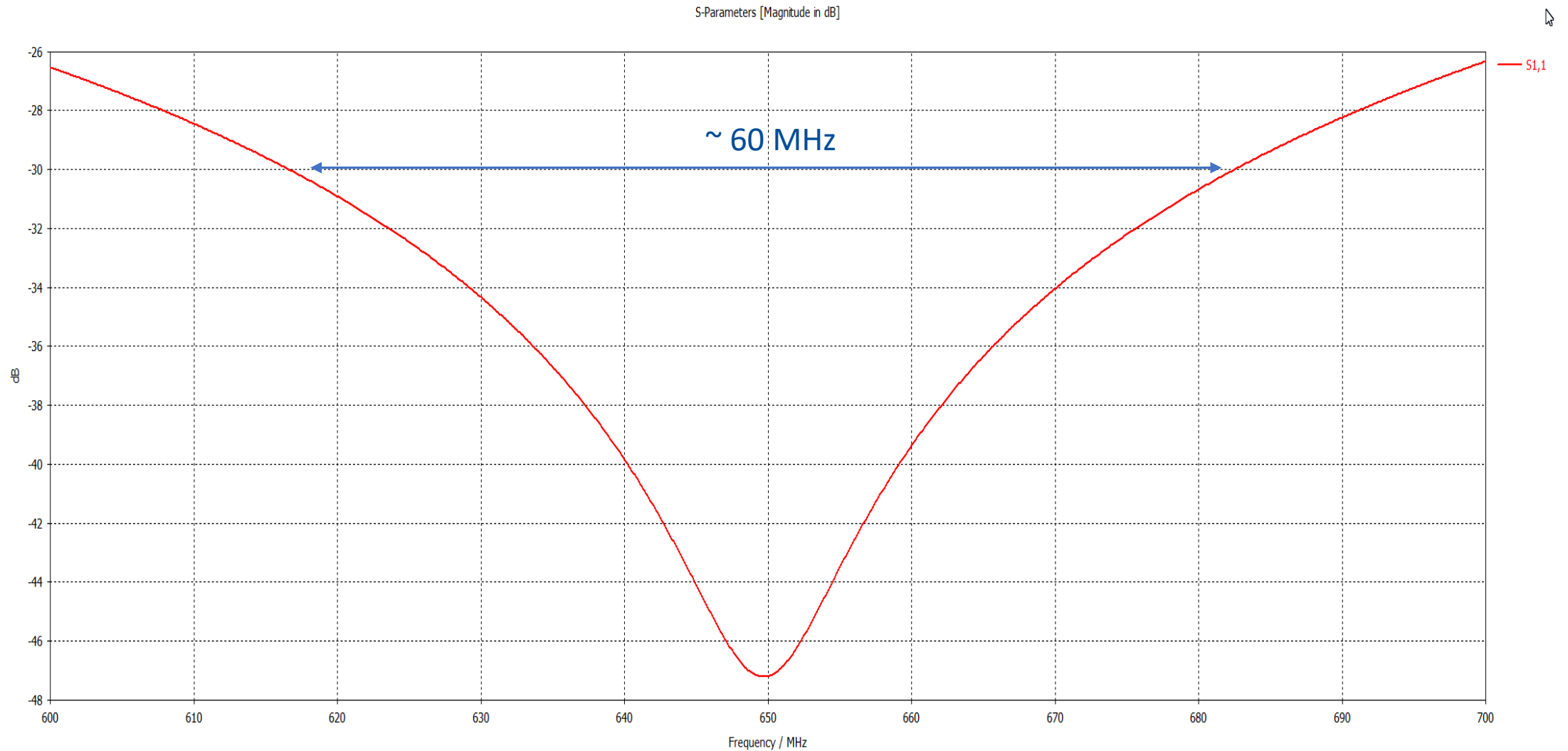
What to can be perform relatively easy is to take into account B1, B2 and B3.

Measurements can be done out of clean room using a dummy coupler instead of real one before a final cavity cleaning.

Two dummy couplers were produced for this purpose:



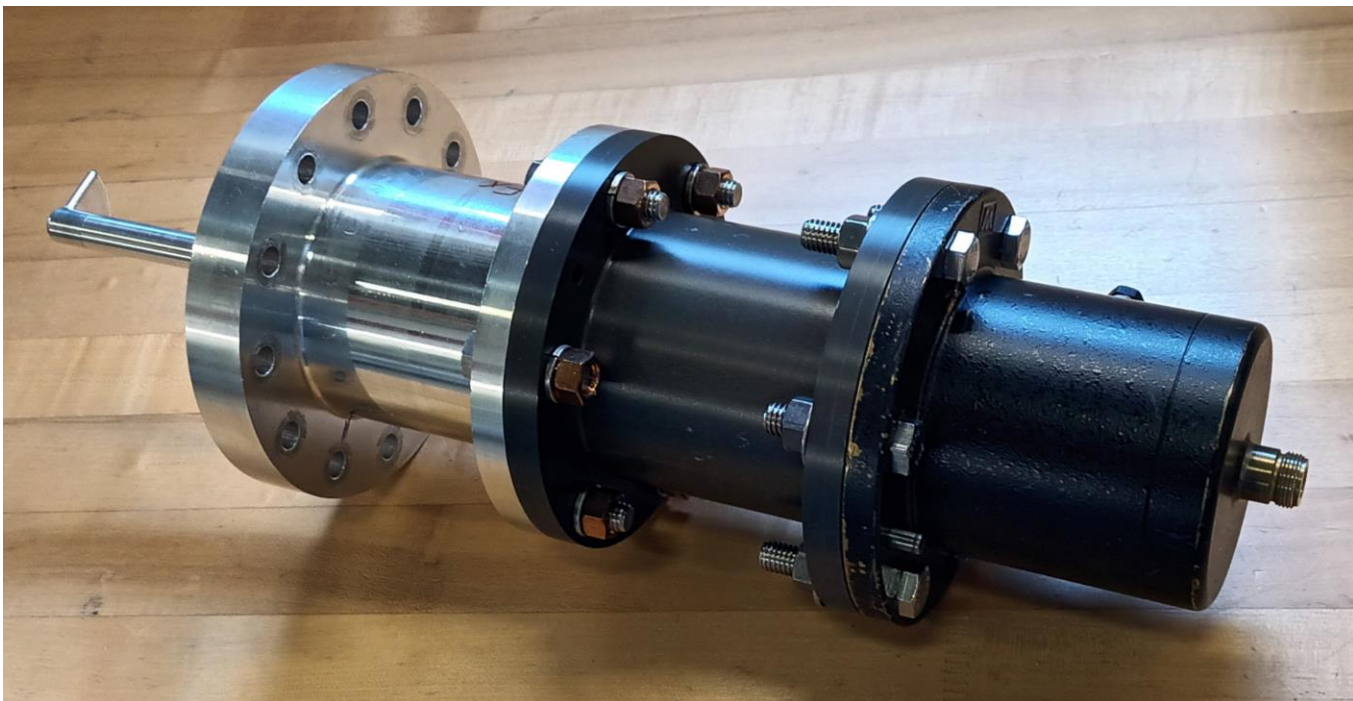
Simulated reflection of dummy coupler



Dummy coupler



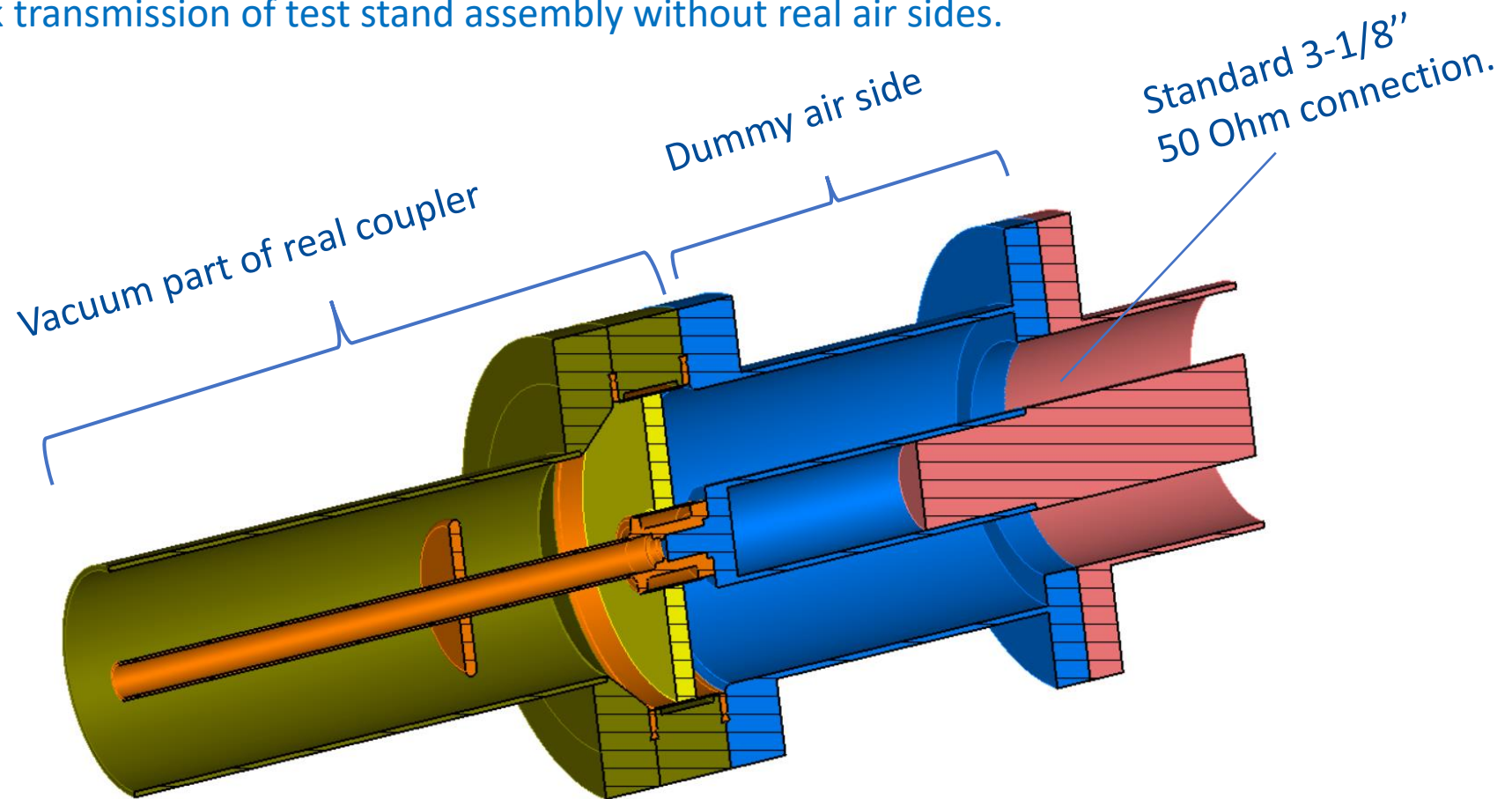
Dummy coupler with 3-1/8 – N-type adapter



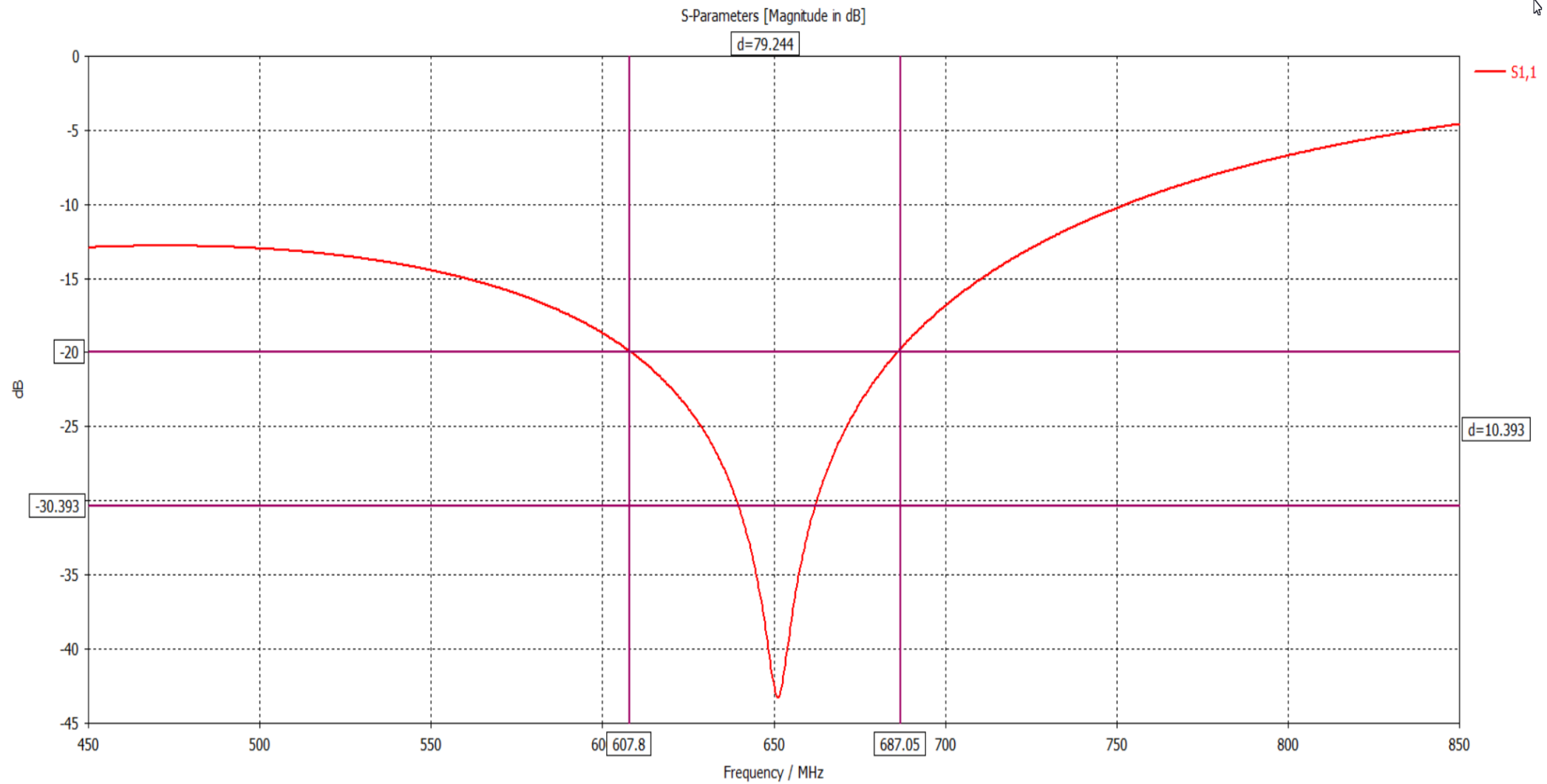
We designed and built the 'dummy air side' with imitate the air side of coupler.

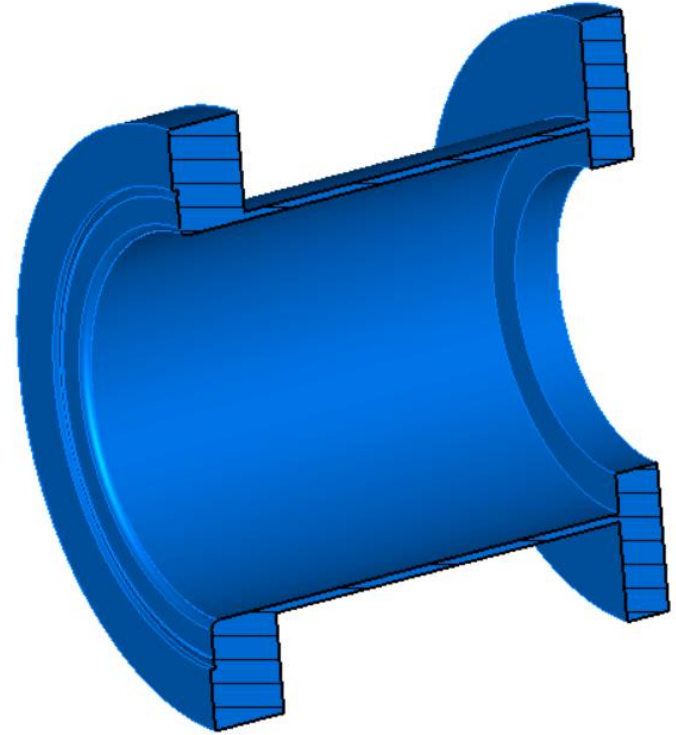
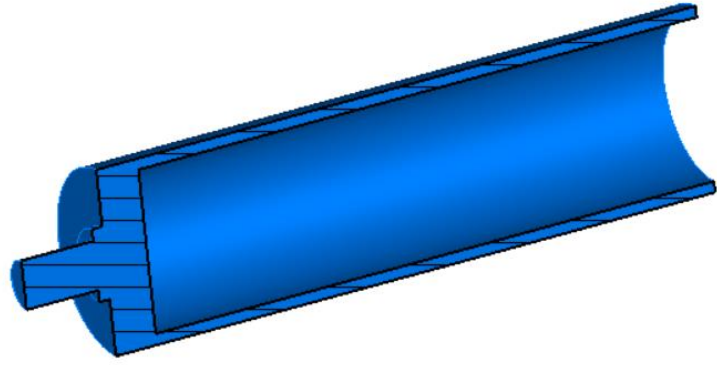
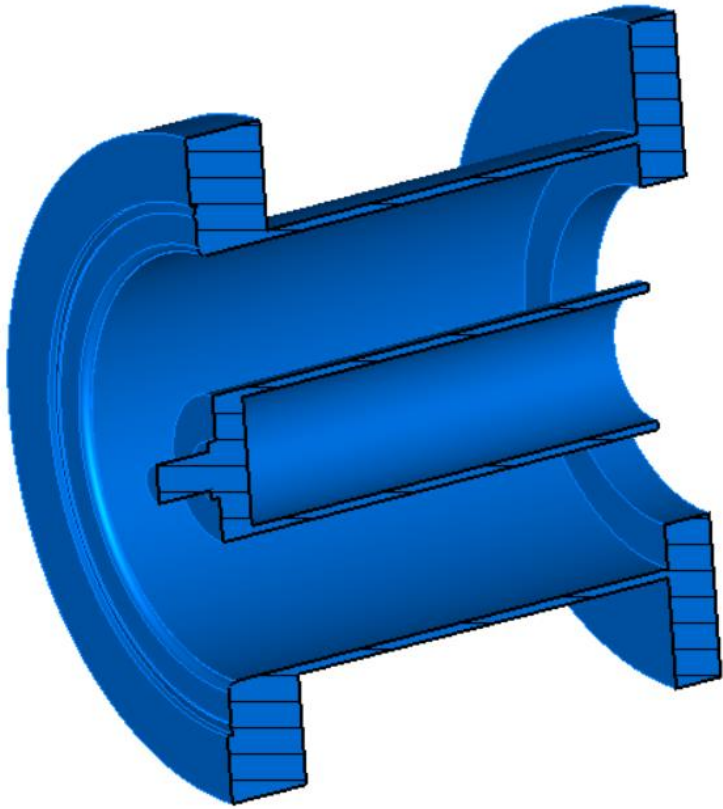
Dummy air side allows:

- Check coupling with real vacuum part without assembling bulky real air side of coupler.
- To check coupling in clean room and correct it if necessary.
- To check transmission of test stand assembly without real air sides.



Simulated passband vacuum part + dummy air side

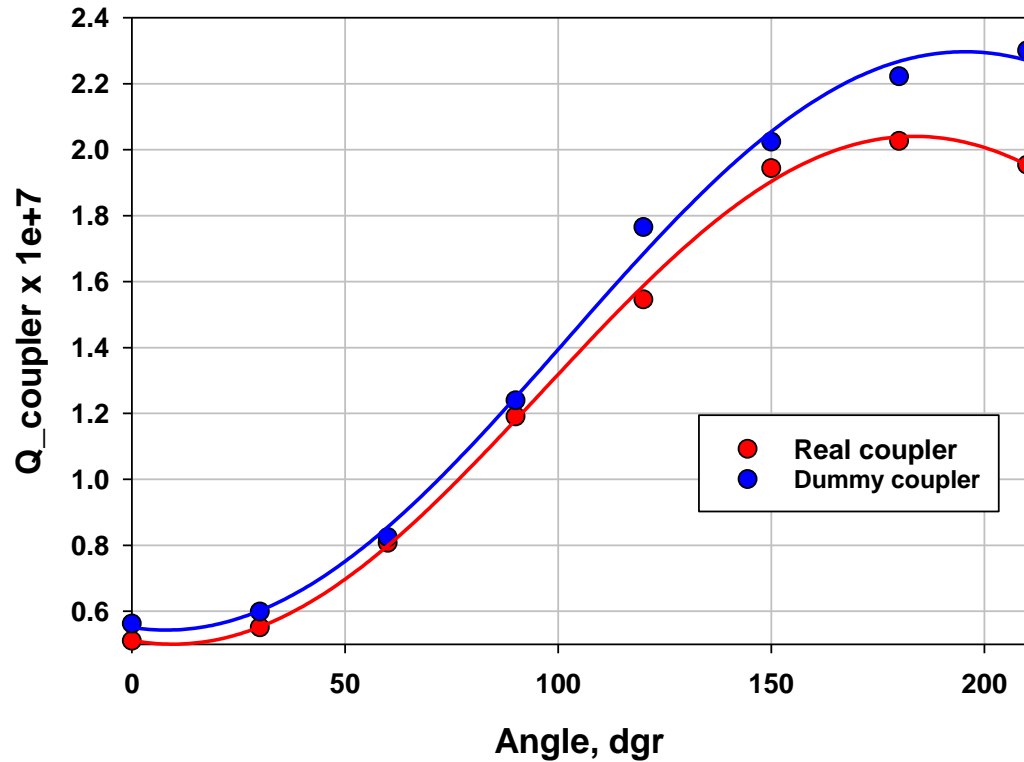




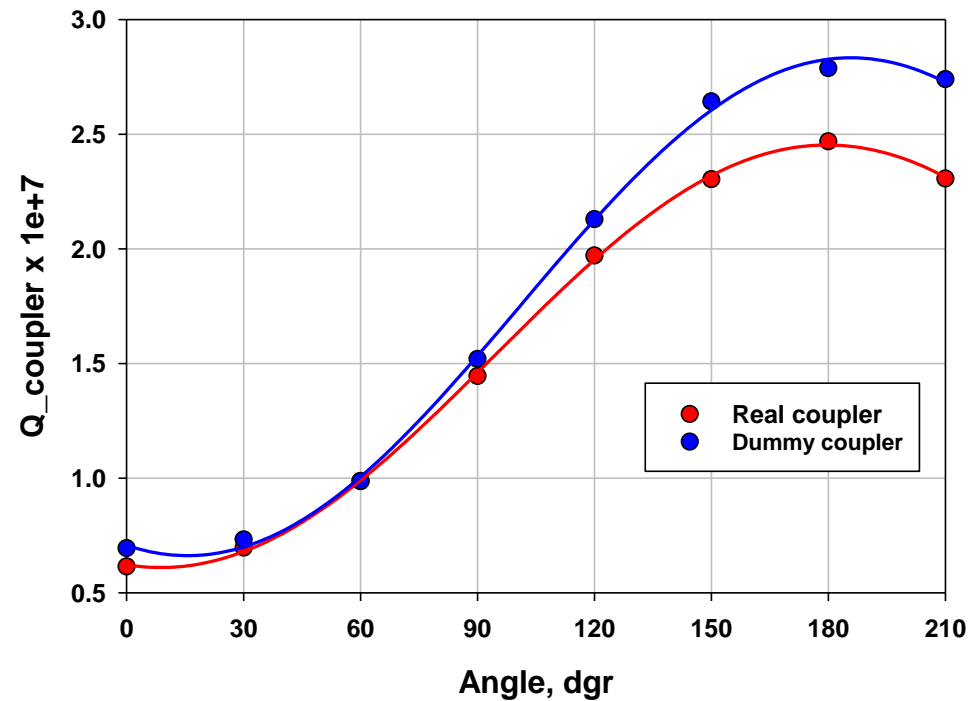
Measurements looks simpler but sometimes we get strange results.
We are still learning how to do it. We need more practice with dummy coupler and dummy air side to elaborate a right procedure.

Measurements done at 01/19/2022

Cavity 502,
Q coupler measurements.

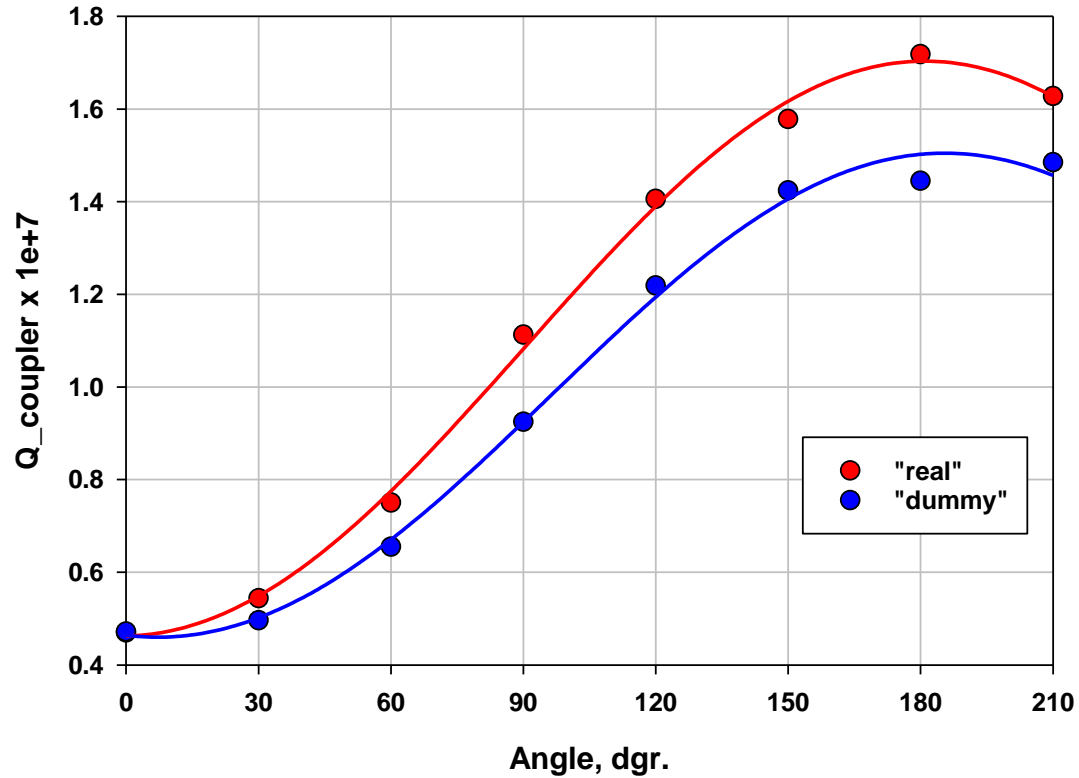


Cavity 504,
Q coupler measurements.



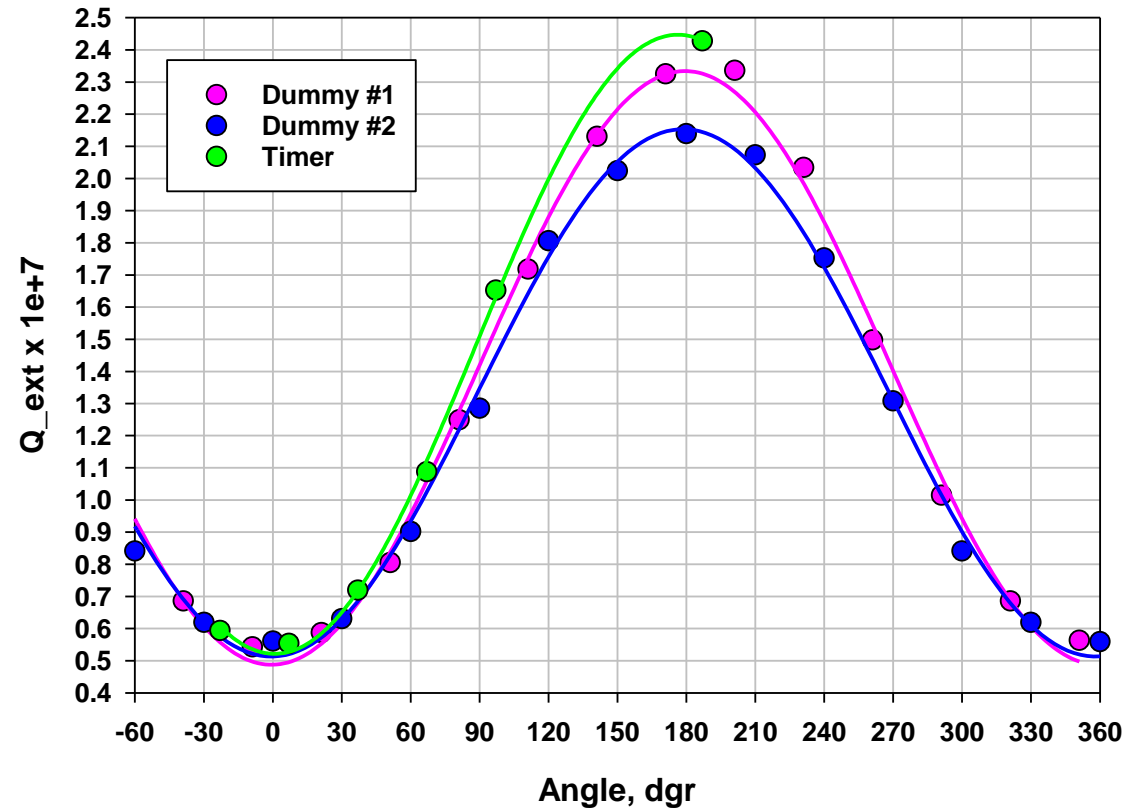
01/27/2022

B61-EZ-001, coupling measurements.



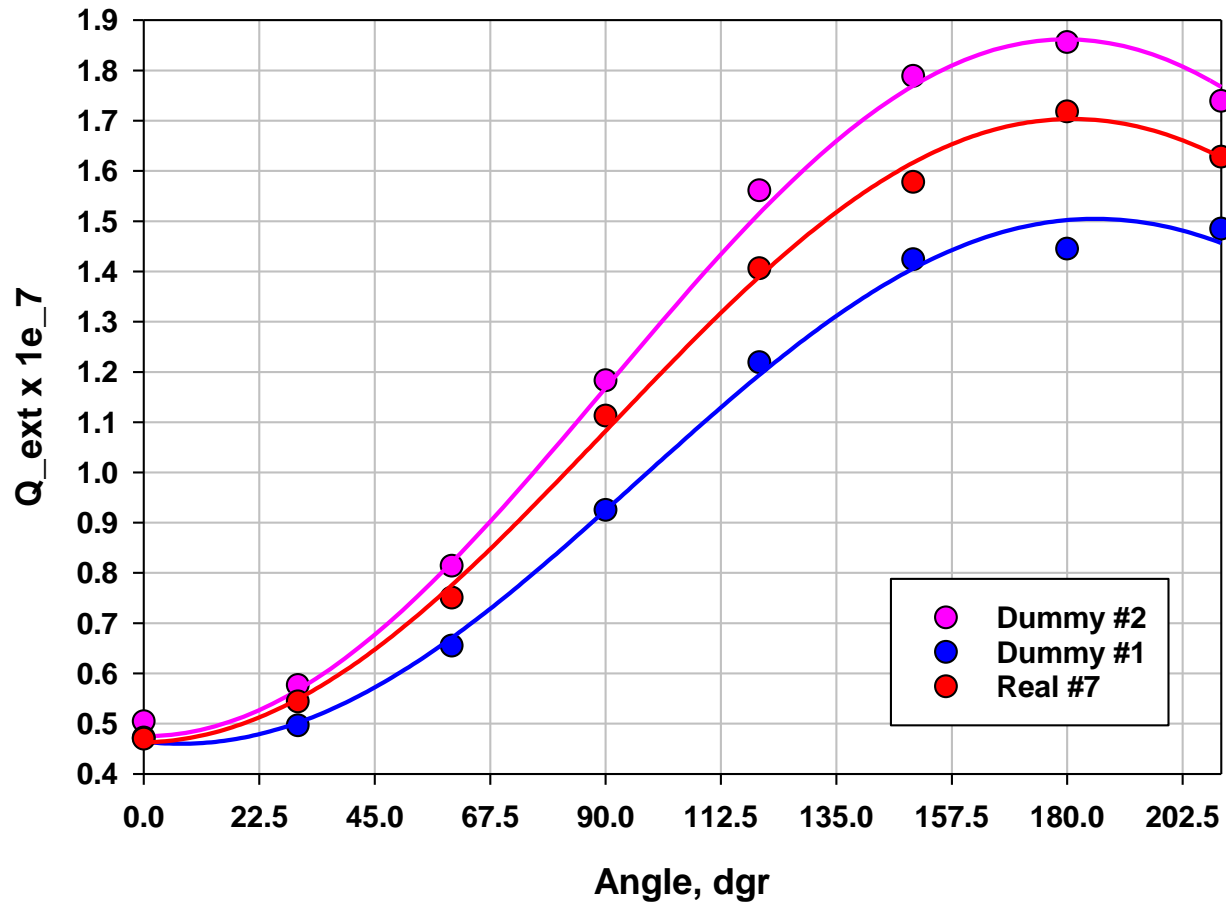
02/01/2022

502, Timer (Dummy X),
Dummy #1, Dummy #2,
Angles are corrected

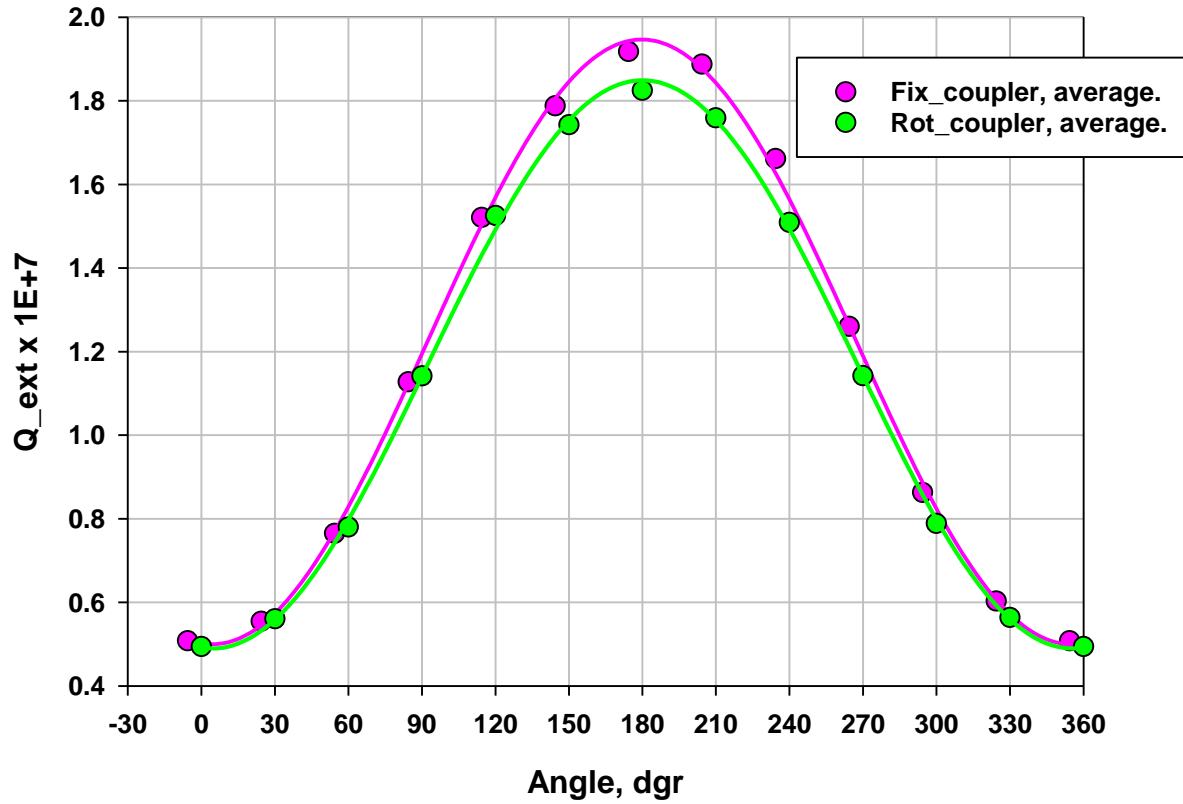


02/03/2022

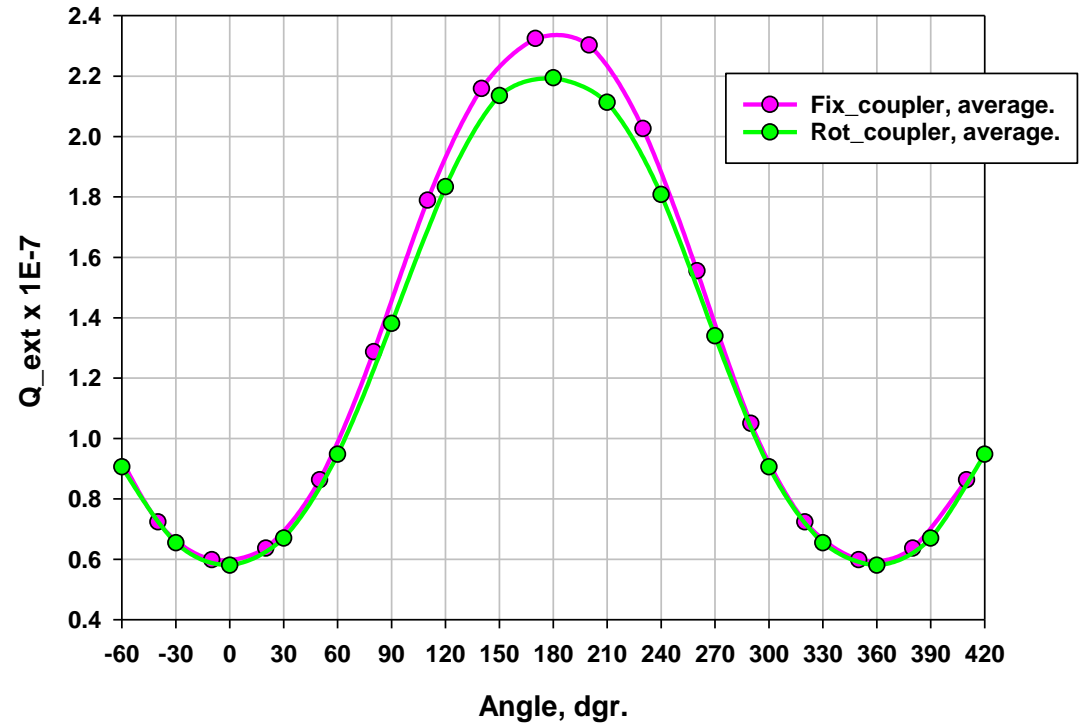
B61_EZ_001, Dummy #2,
02/03/20200



Cavity B61C-EZ-103,
measurements with dummy couplers.

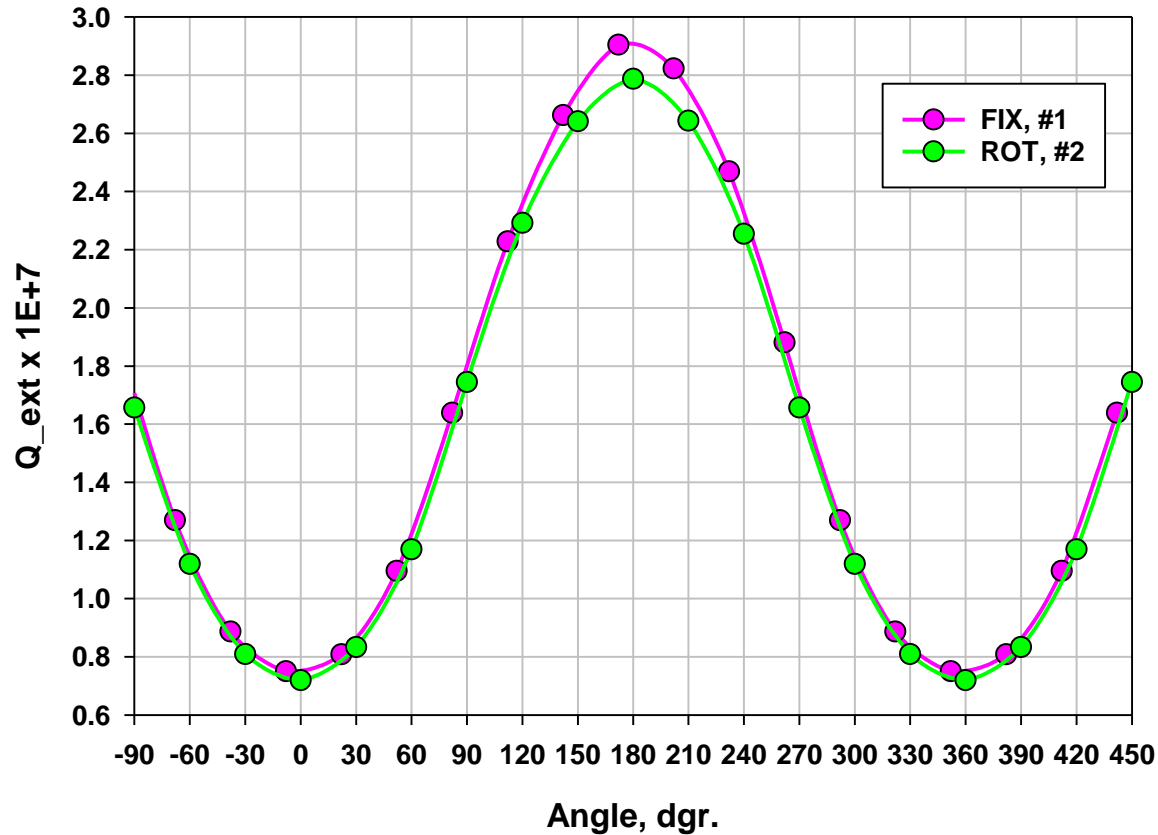


Cavity B61-EZ-101,
Measurements with dummy couplers.



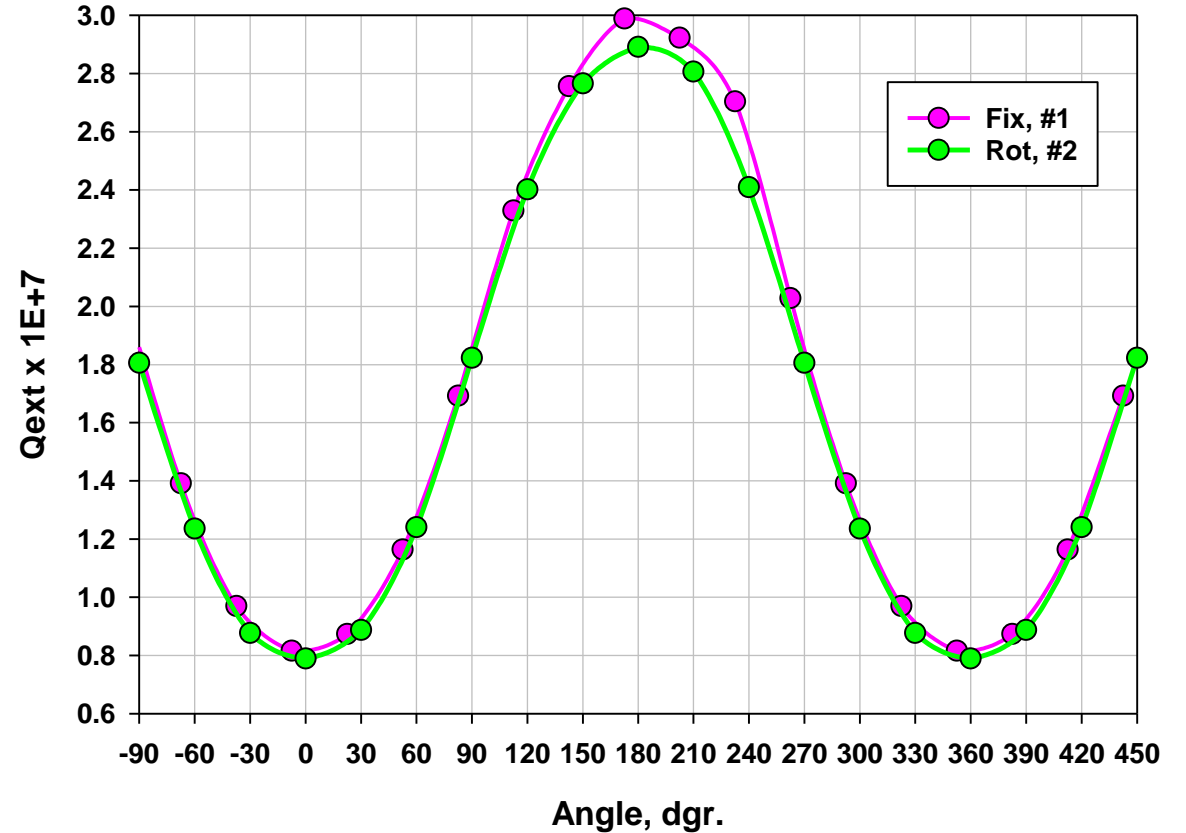
06/10/2022

B92-RI-202, Qext measurements, 06/10/2022.
FIX, #1, angle shifted -8 dgr.



06/22/2022

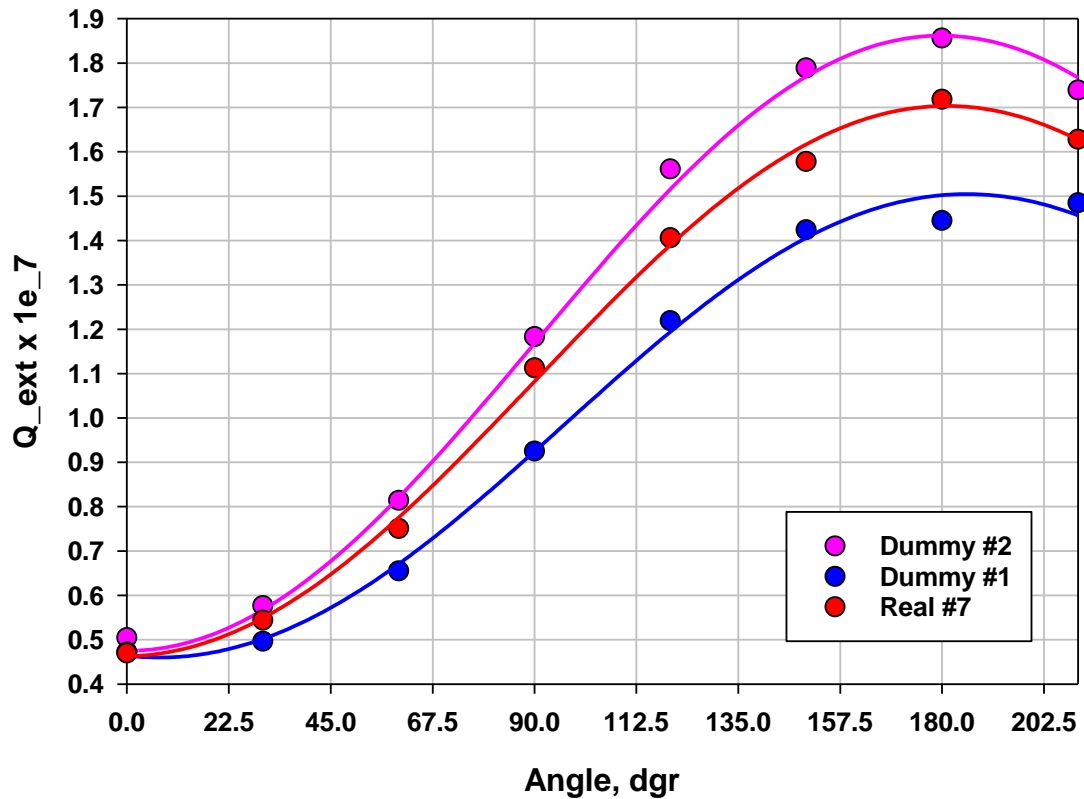
B92-R201-201, Qext measurements, 06/22/2022.
FIX, #1, angle shifted -7.5 dgr.



We have a progress:

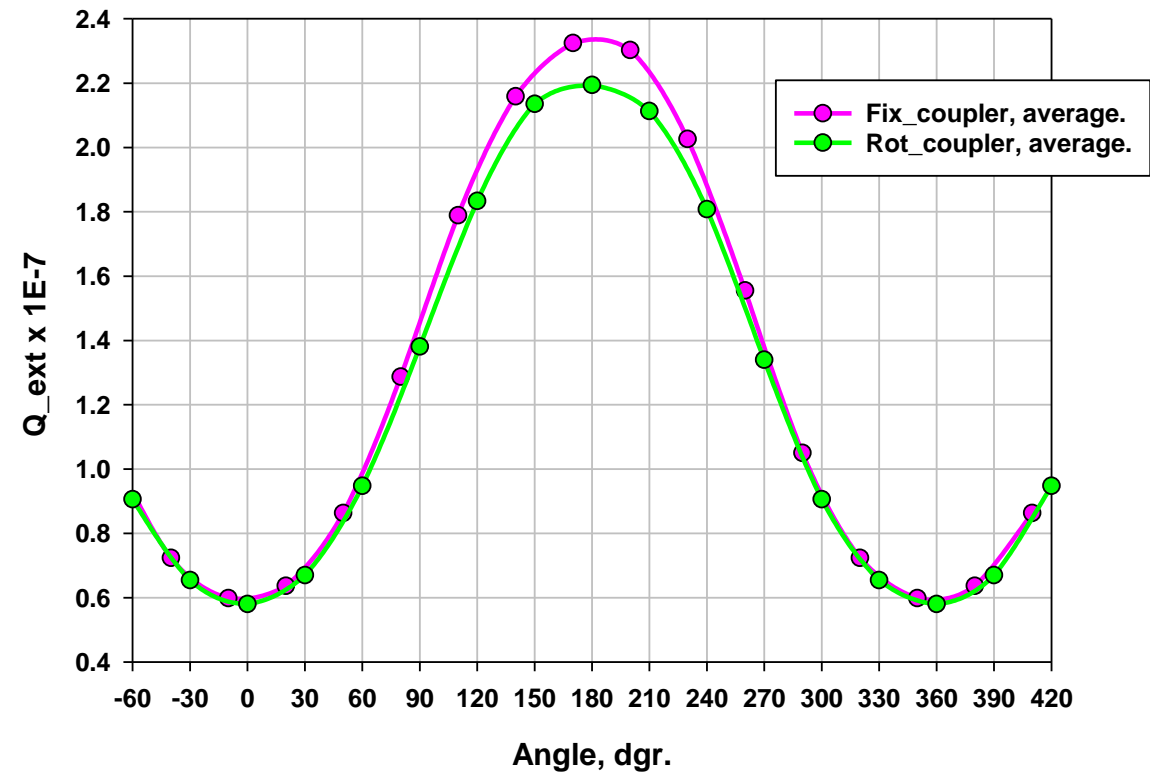
02/03/2022

B61_EZ_001, Dummy #2,
02/03/20200



06/07/2022

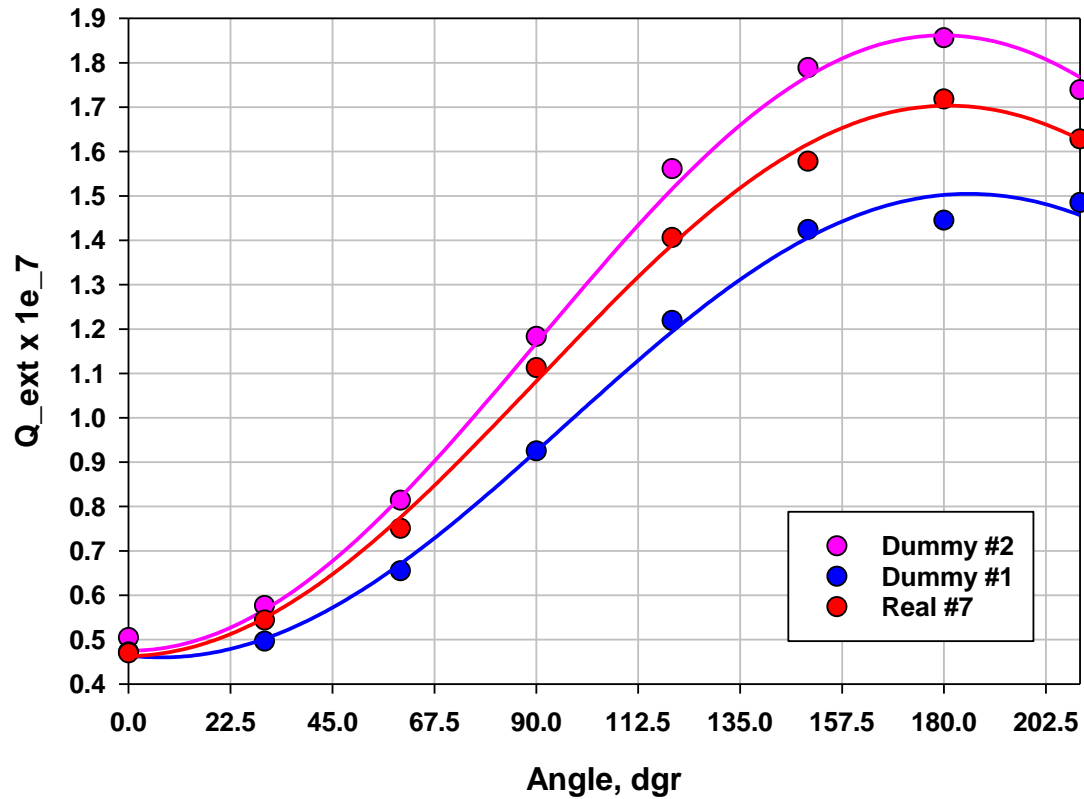
Cavity B61-EZ-101,
Measurements with dummy couplers.



We have a progress:

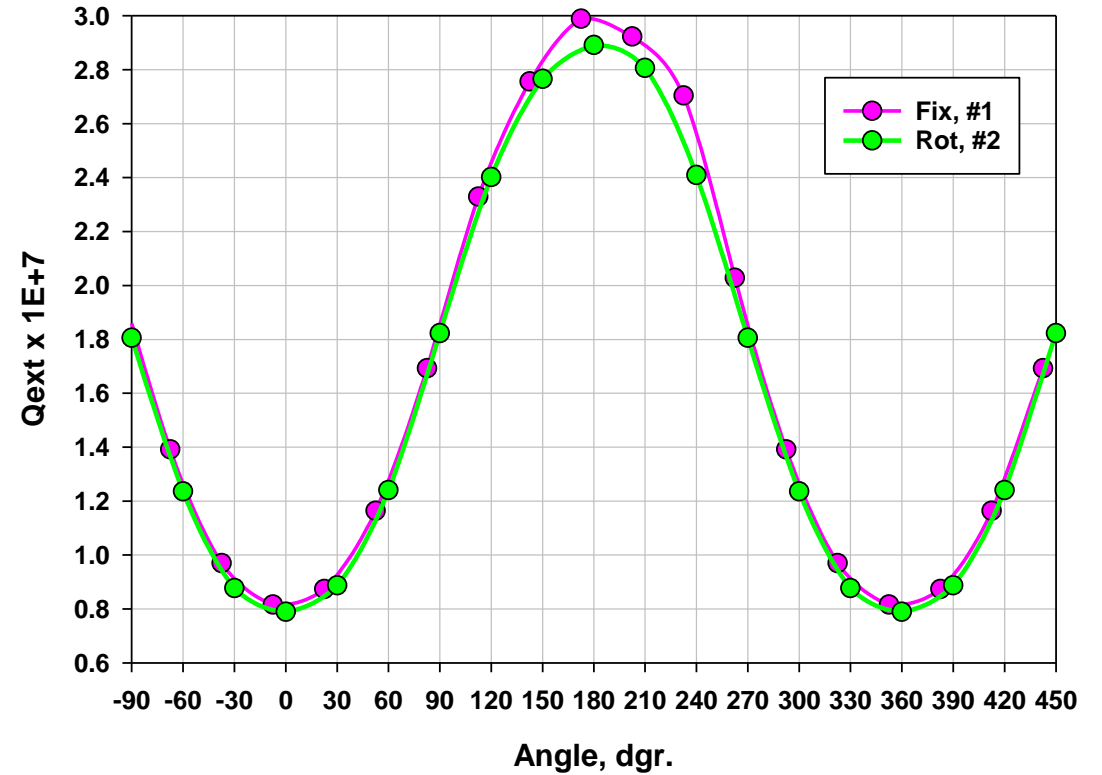
02/03/2022

B61_EZ_001, Dummy #2,
02/03/20200



06/22/2022

B92-R201-201, Qext measurements, 06/22/2022.
FIX, #1, angle shifted -7.5 dgr.



Conclusions:

- There is a progress with measurements with dummy couplers:
Couplers #1 and #2 show very close results.
Good agreements between dummy couplers results and last direct measurements at STC.
- We need more practice of measurements with real vacuum parts and dummy couplers.
- Work continues