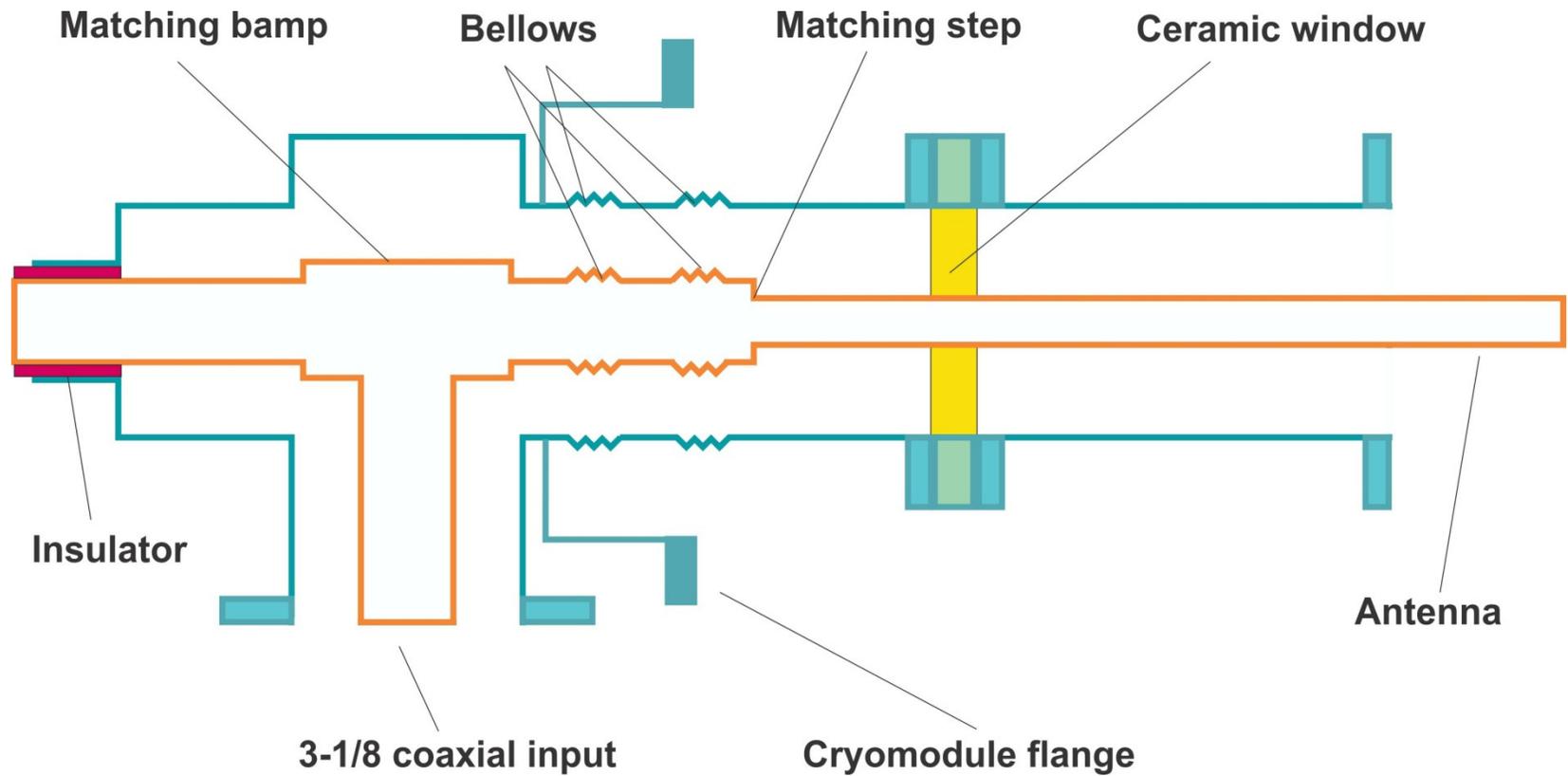


Status of 325MHz coupler

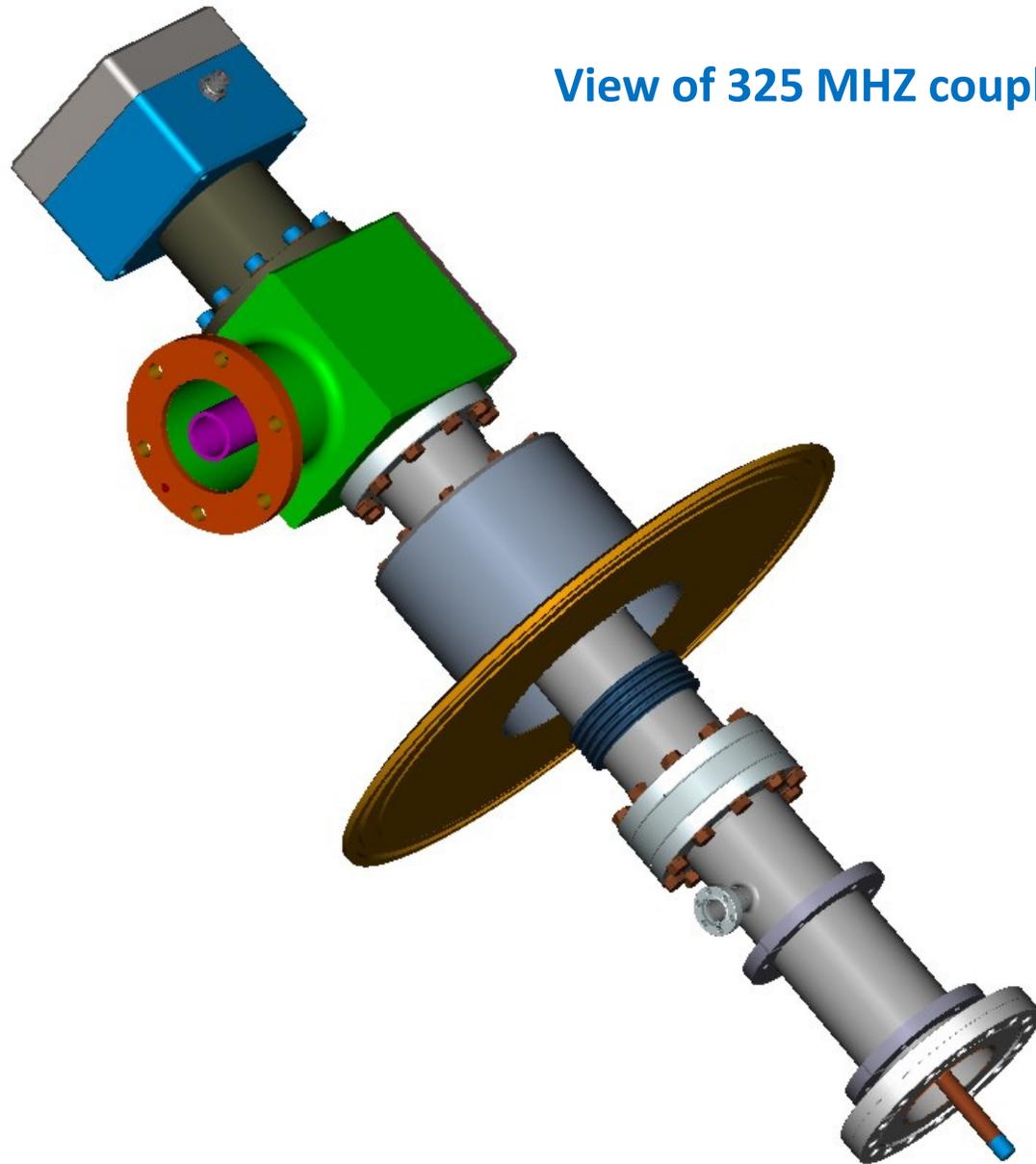
S. Kazakov

11/29/2011

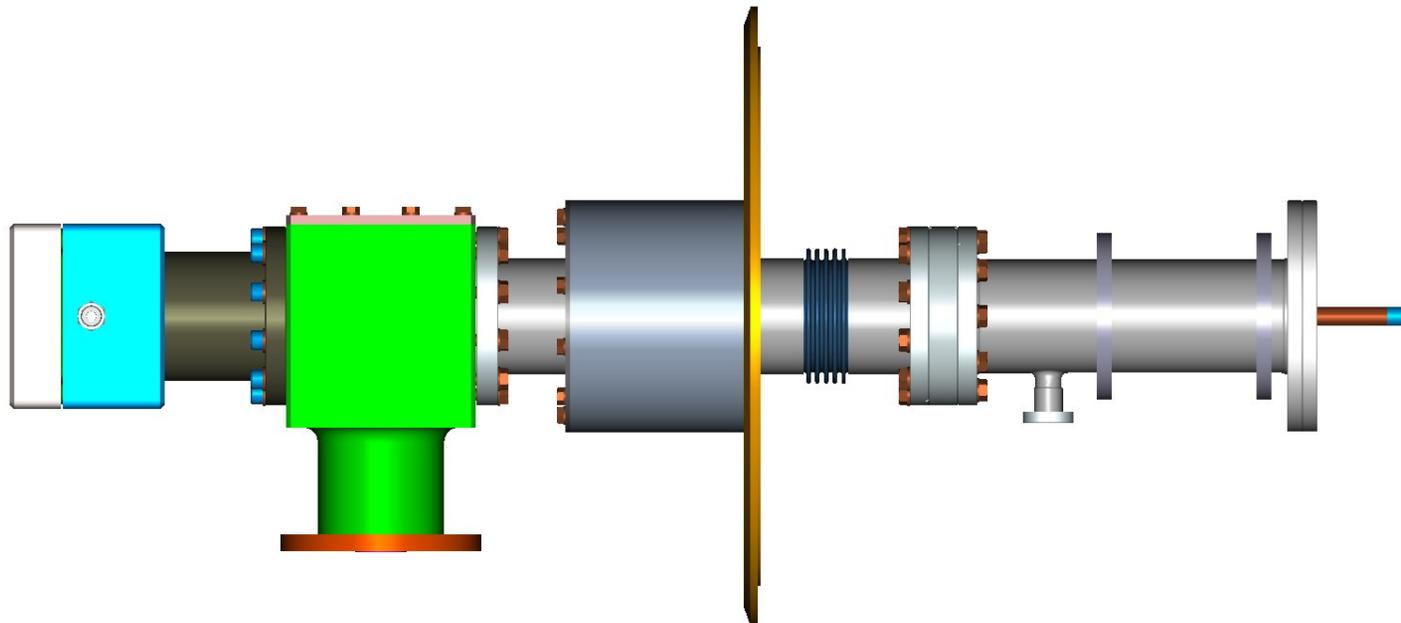
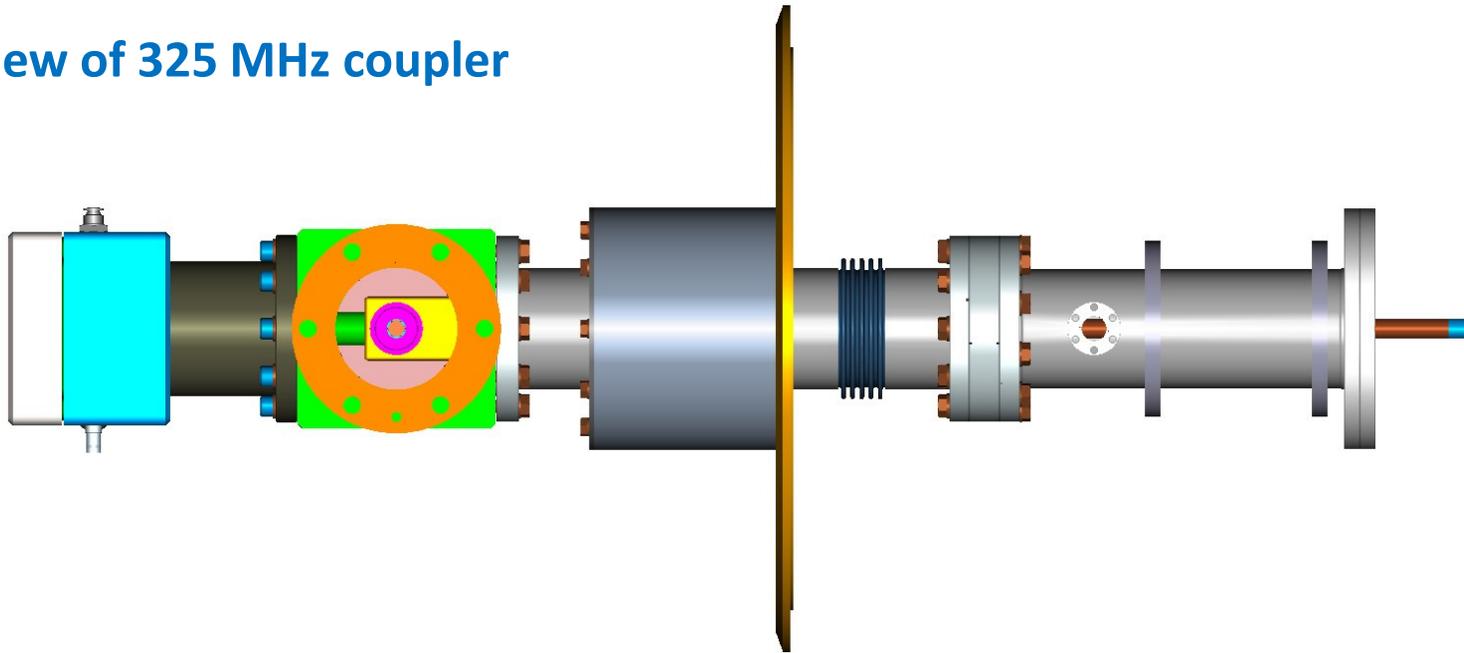
325 MHz coupler structure

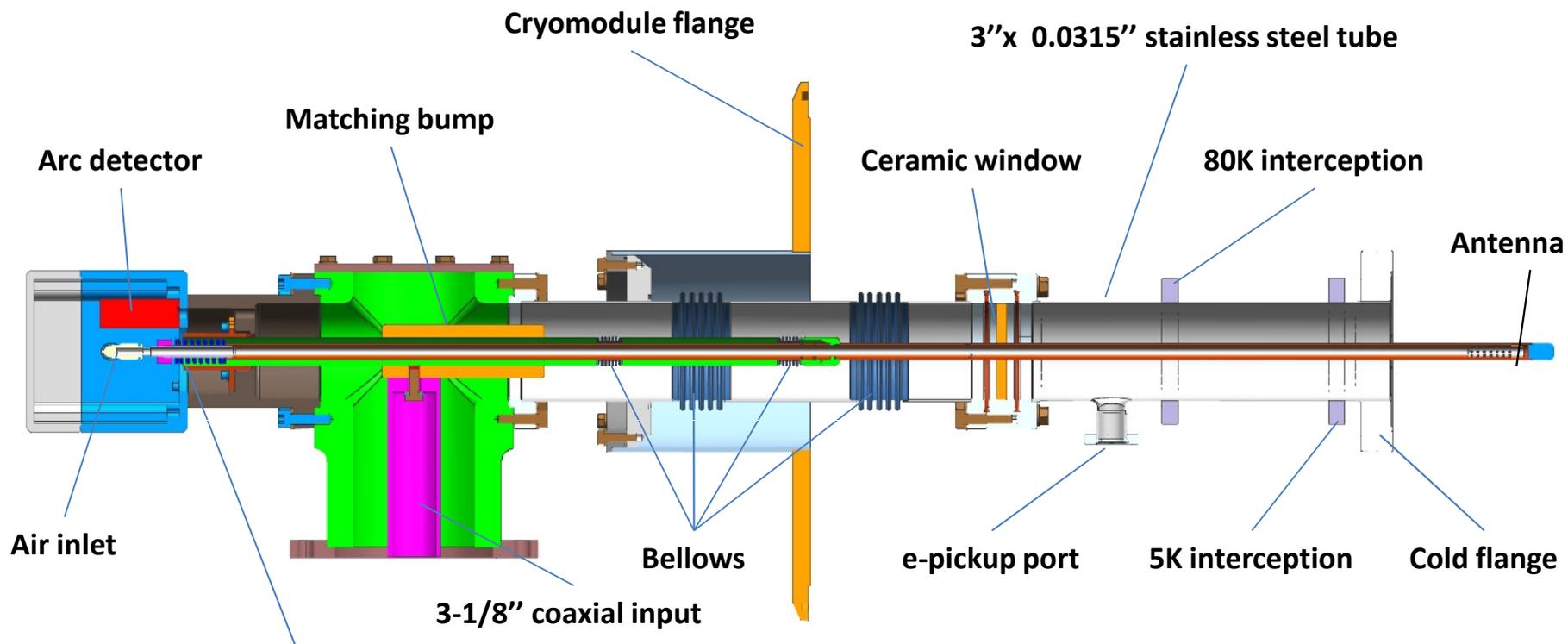


View of 325 MHz coupler

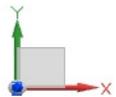


View of 325 MHz coupler

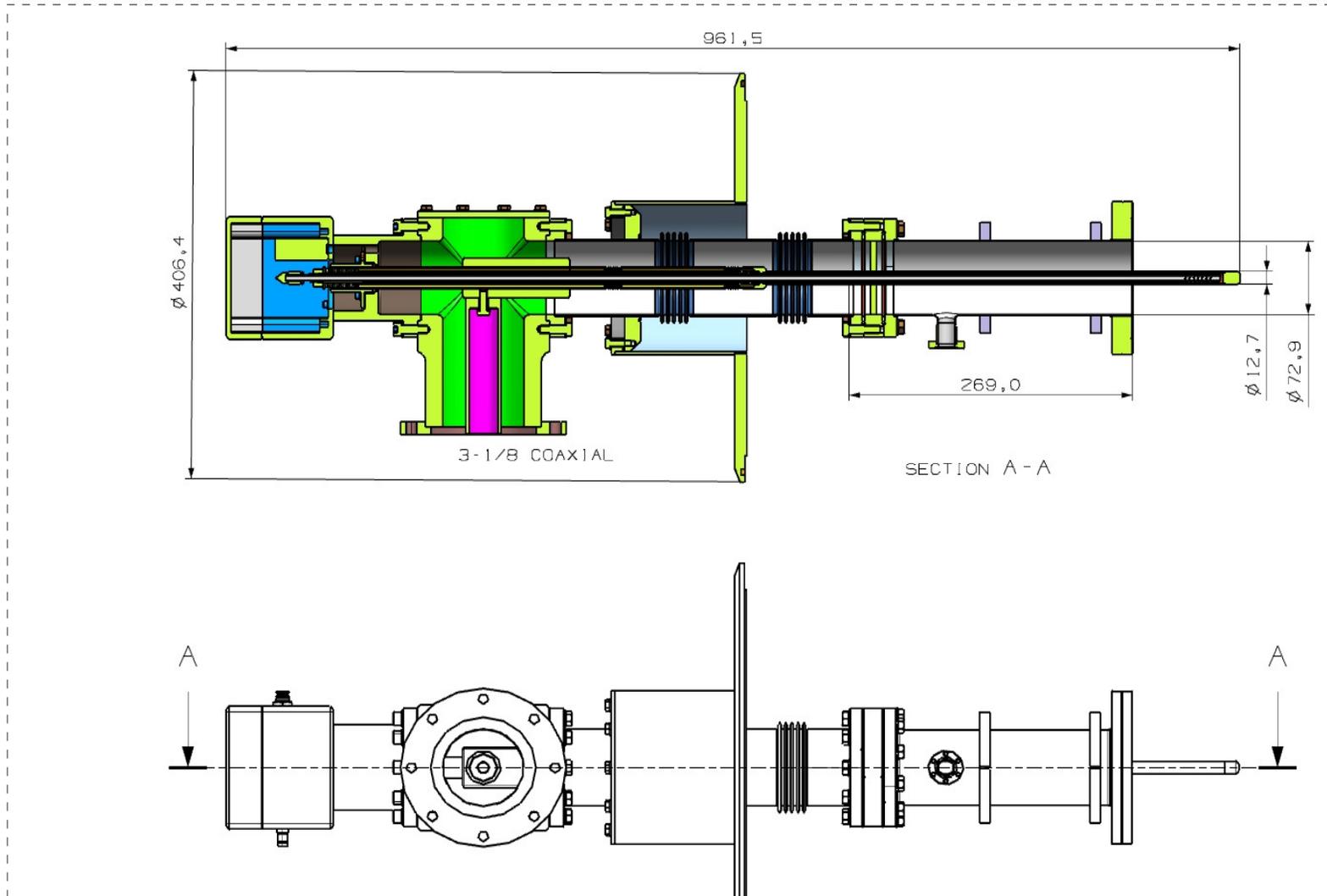




Spring to compensate thermal expansion



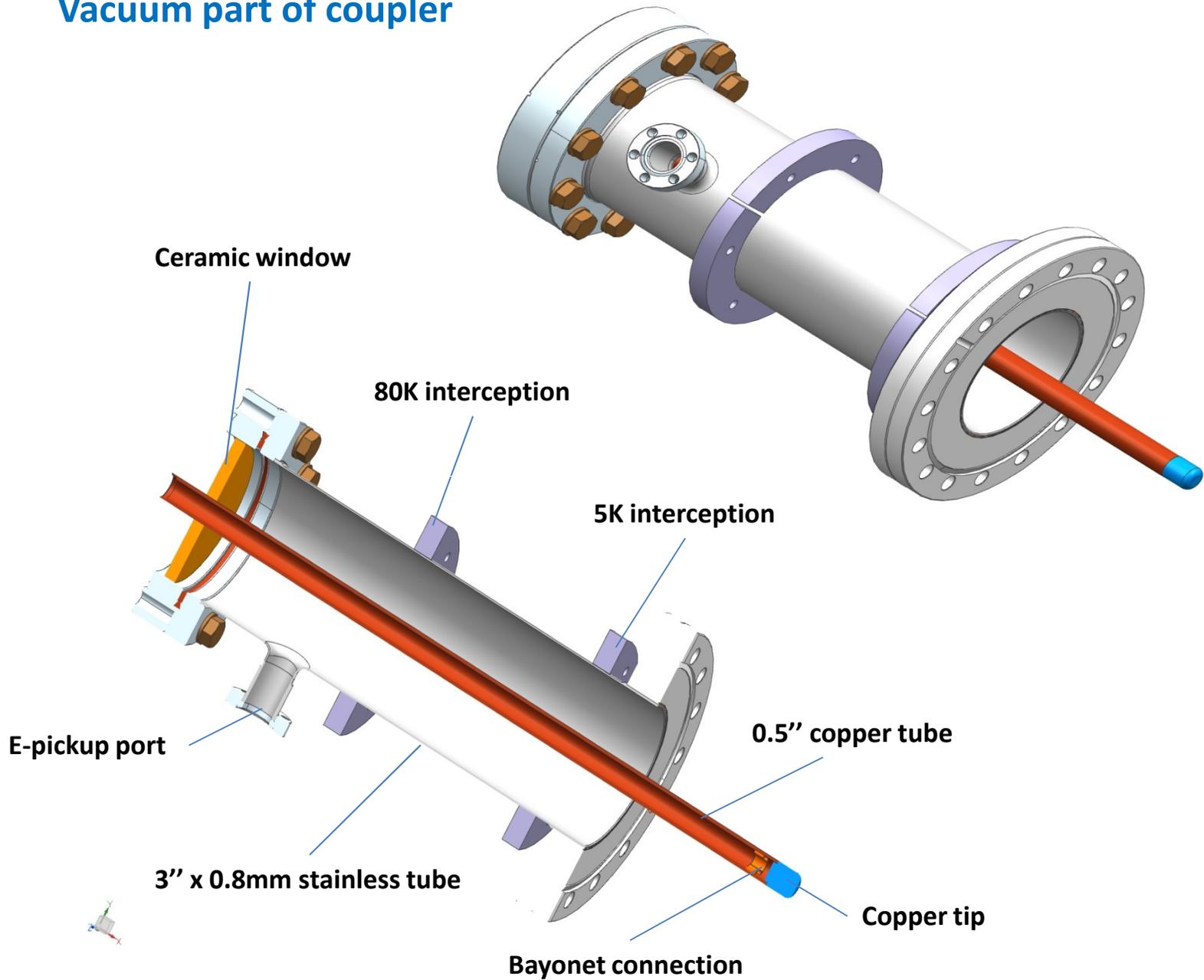
Main sizes of coupler



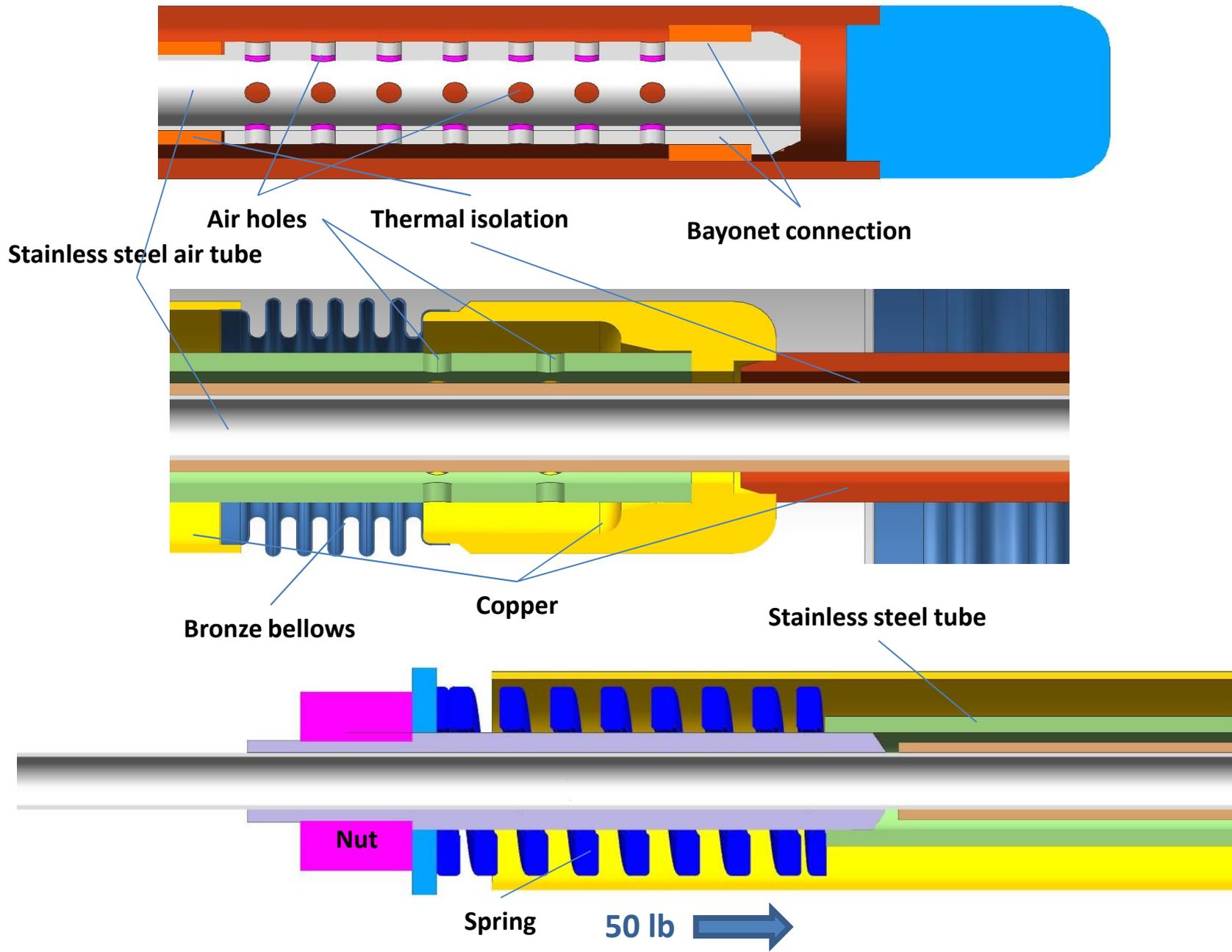
Sheet "Sheet 1" Work

Coupler have been designed to be interchangeable with Khabibuolline-Nicol coupler

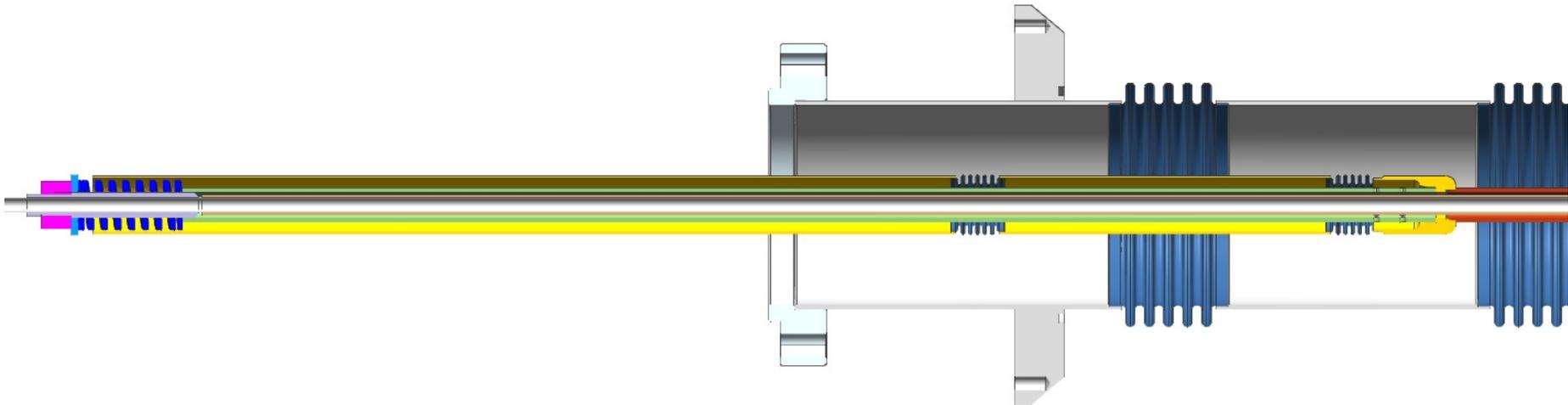
Vacuum part of coupler



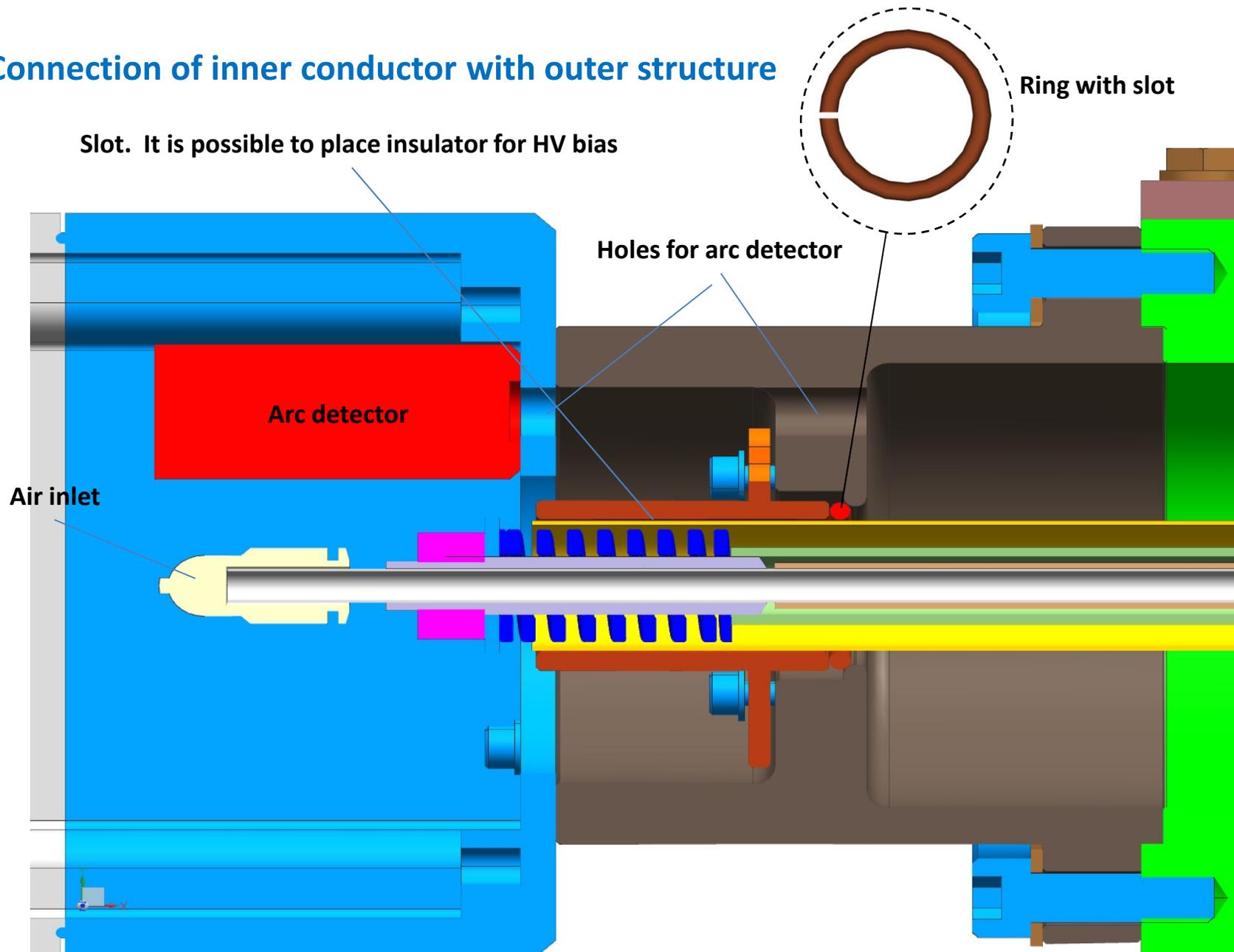
Joins of inner conductor



Assembled inner conductor



Connection of inner conductor with outer structure



Main electrical parameters of coupler

Design CW power ~ 6kW

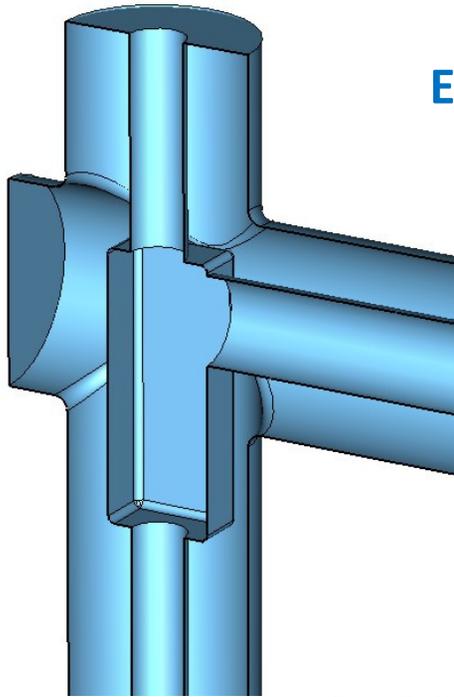
(with air cooling, copper plated vacuum outer conductor,
copper-bronze air outer conductor it can sustain several tens kW)

Pulse power (breakdown in air) ~ 1MW

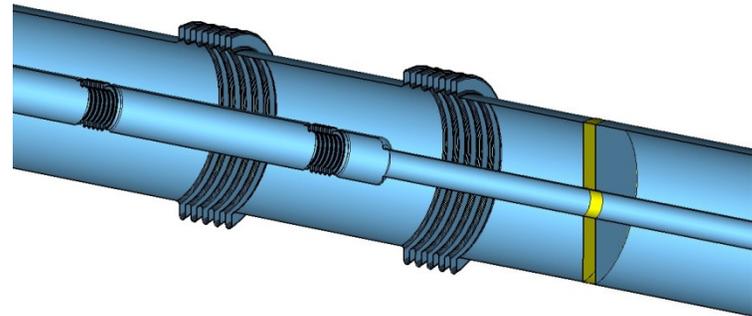
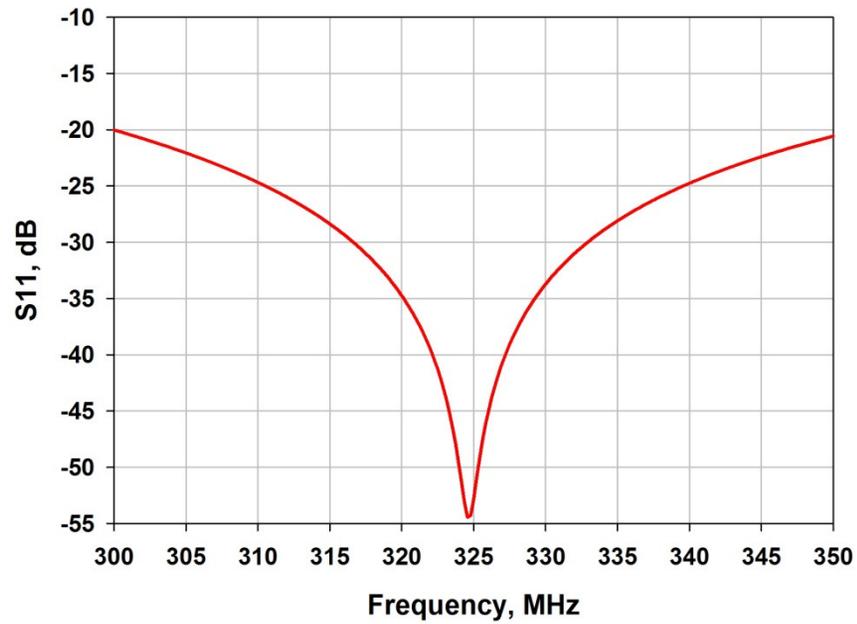
Multifactor threshold > 6 kW SW (>25kW TW)

Passband ($S_{11} < -20\text{dB}$) ~ 50MHz, (15%)

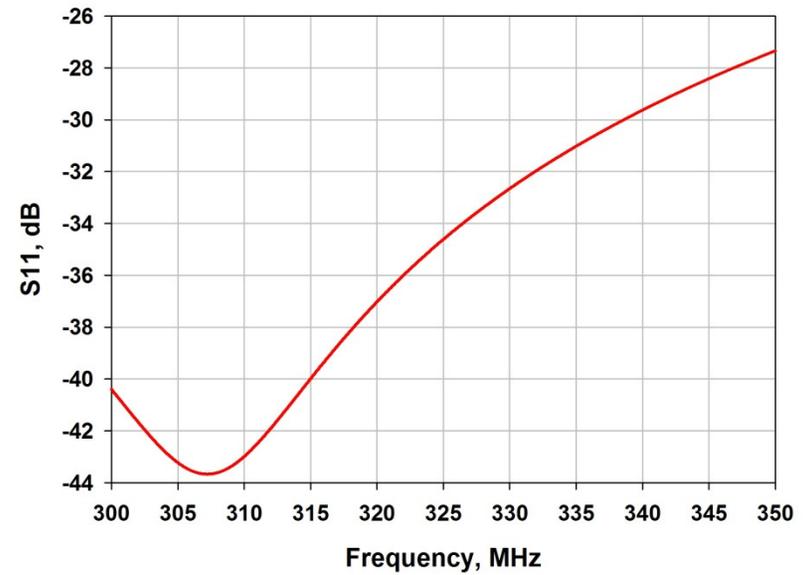
Expected passband ~ 50 MHz ($S_{11} < -20$ dB), $\sim 15\%$



Passband of T-part



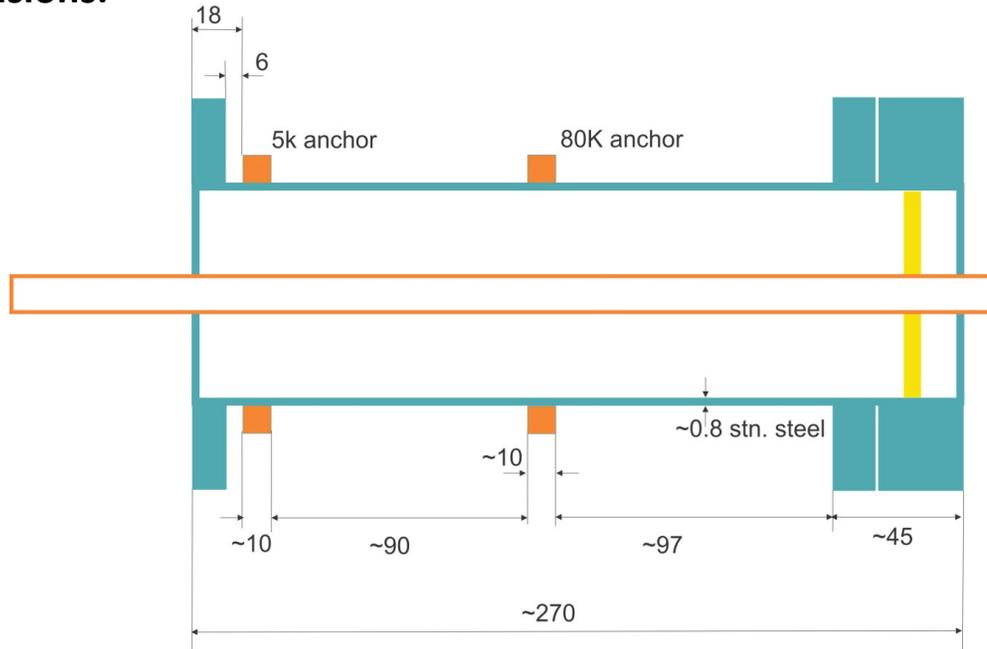
Passband of bellows part



Thermal properties

Optimal sizes for $P_{in} = 6kW$,
no copper coating

Dimensions:



	$P_{2K} / P_{pl}, W$	$P_{5K} / P_{pl}, W$	$P_{80K} / P_{pl}, W$	$P_{pl} \text{ total}, W$
$P_{in} = 0kW$	0.02 / 17	0.69 / 179	4.29 / 86	282
$P_{in} = 6kW$	0.12 / 108	1.10 / 286	5.05 / 101	495

P_{in} – input power

P_{2K} , P_{5K} , P_{80K} – dissipated powers at 2K, 5K, 80K

P_{pl} – cryo-plant power

Current status:

Design is nearly finished.

Unknown items:

- Length of antenna. Coupling value should be chosen and simulated.
- Tip shape (depends on test stand cavity design)
- Configuration/geometry of 5K, 80K, 300K thermo-interceptors
- Configuration of air part outer conductor (coated SS, copper-bronze or uncoated SS)

Next steps:

**If present design is acceptable (we need approval from community?) ,
we suppose to make mechanical model to check the method of assembly,
antenna air cooling, acoustic vibration of antenna.**