Crab Cavity Manufacturing Readiness Meeting

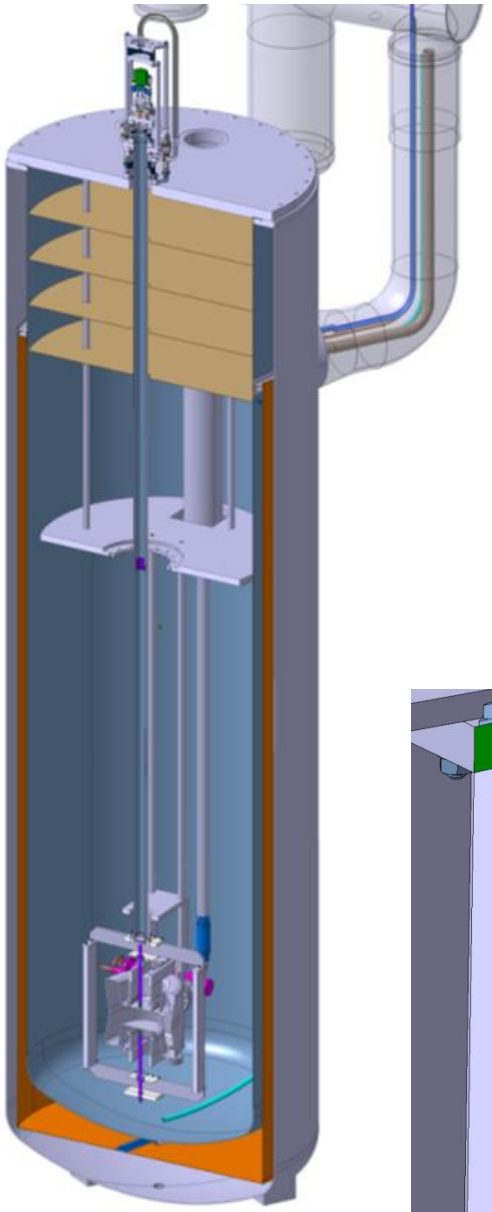
CERN, Switzerland, 1-2 October 2014

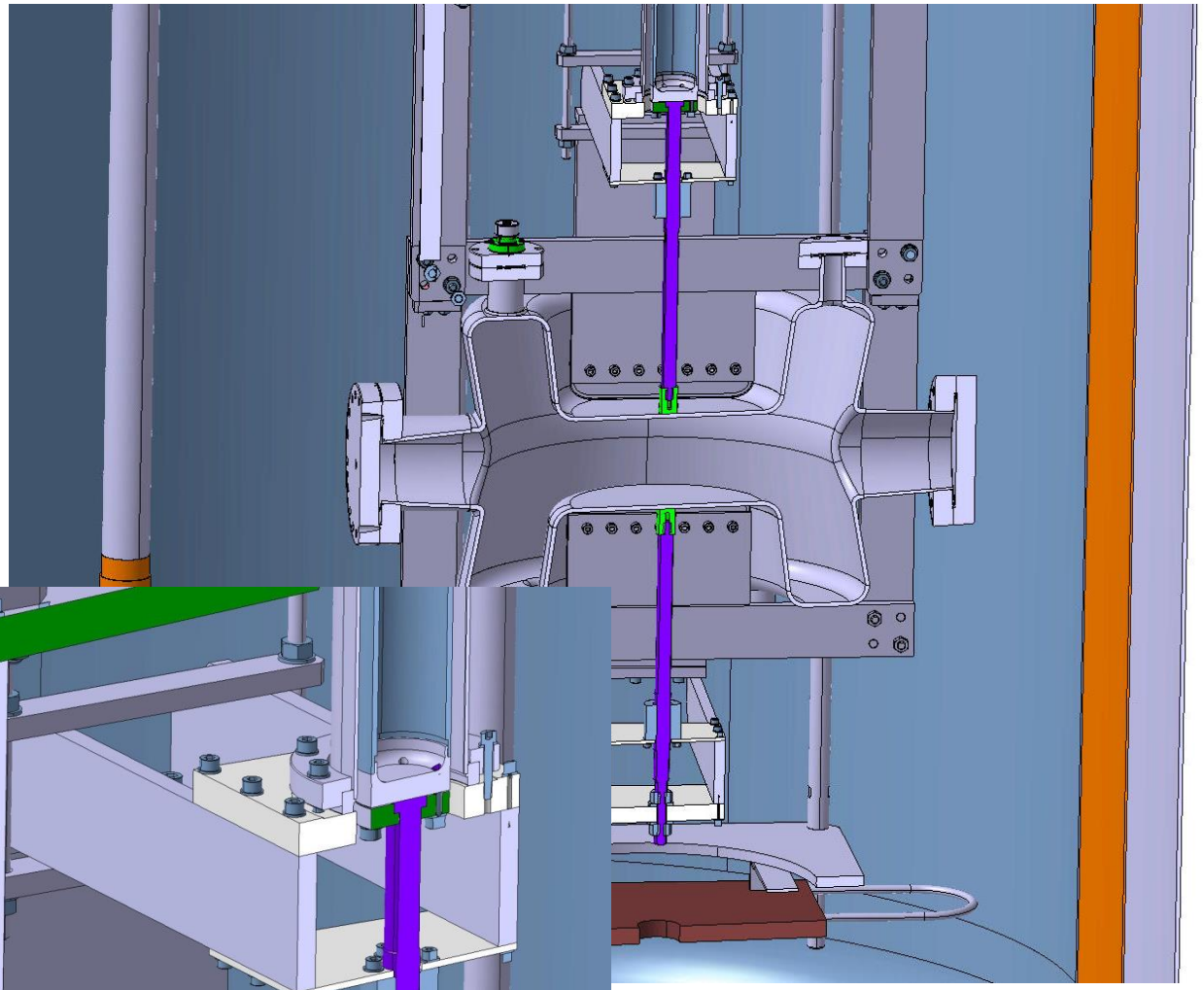
STATUS FREQUENCY TUNER

PREPARATION TEST SM18 CAVITY IN TEST CRYOSTAT
STATUS IMPLEMENTATION IN CRYOMODULE

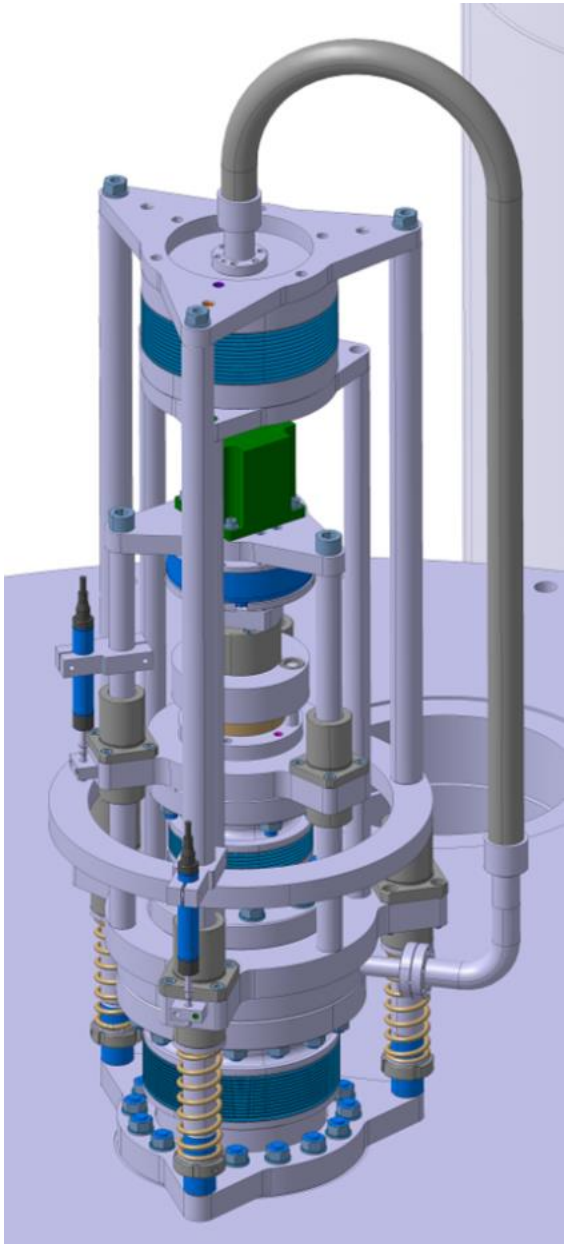
Kurt Artoos

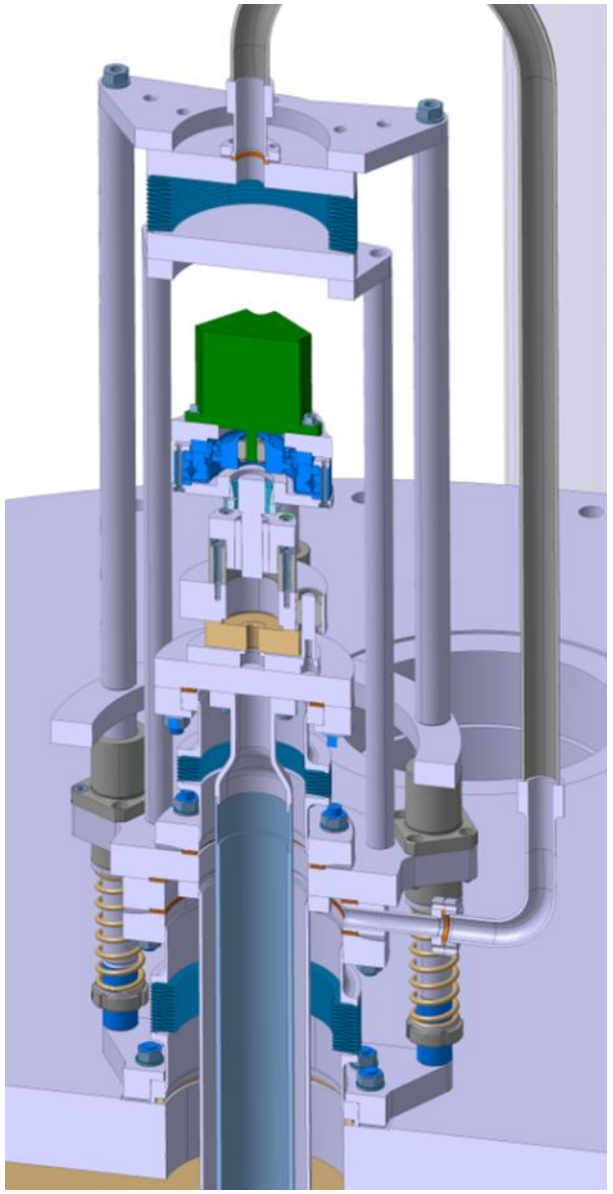
Test SM 18 (asap, p.op., confirmation tuning



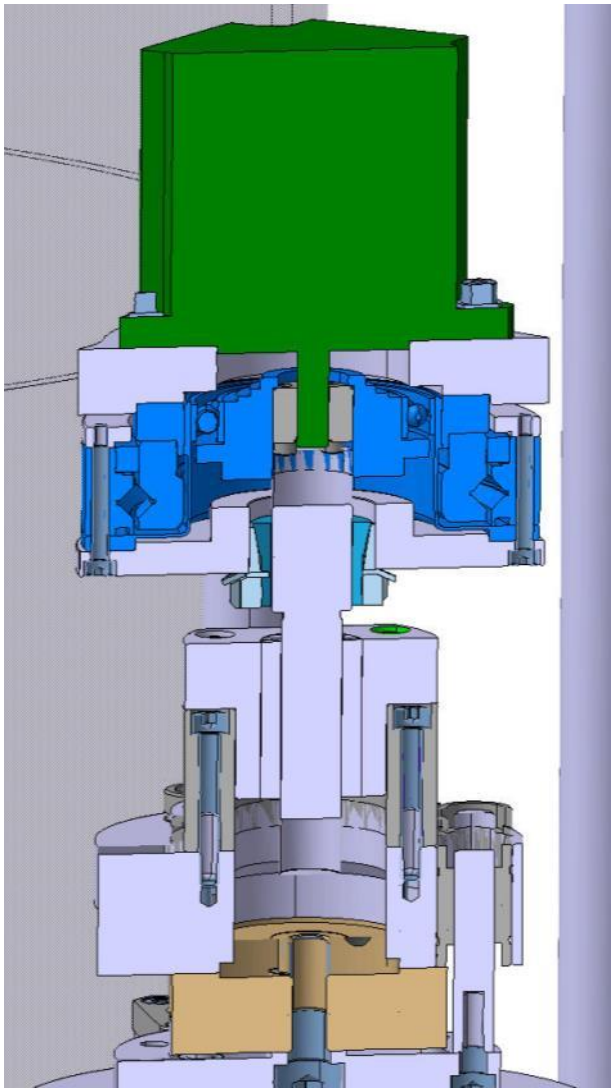


Design: Pierre Minginette





Design: Pierre Minginette



Design: Pierre Minginette

Protection by interlocks,
Reduce motor holding torque ?

SM18 test

Moteur 1.3 Nm Bipolar Nema 23 (1.8 deg/step?)
Check interface

Harmonic drive HFUS-20-100-2SO
Ratio i : 0.01 ,
repeat. peak Torque 82 Nm, average torque 49 Nm
Accuracy < 1 arcmin, precision <0.1 arcmin
Fa Dyn 7.7 kN, η=~0.80 (grease, 20 °C)

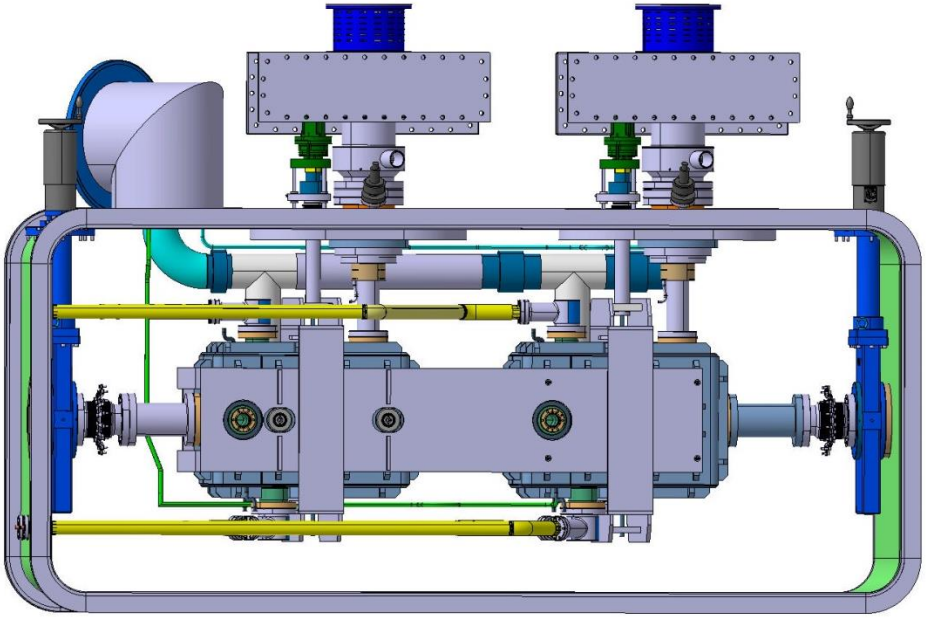
Roller screw Rollvis RV 12 x 1
η=0.79 , static load capacity 17 kN

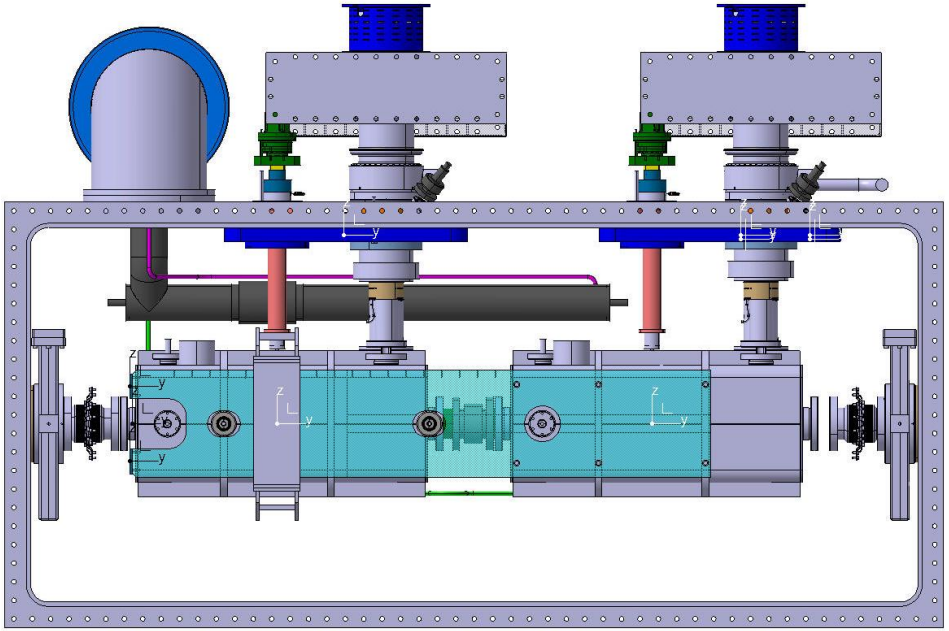
Holding torque motor

$M = p\, i\, F / 2000\, \pi\, \eta = 0.0063$ Nm F= 2.5 kN, p= 1

Detend torque 0.017 Nm ? Would be ±self locking
(mass not yet taken into account)

Potentiometer Megatron RC13-25 M
Load cell Kistler
4576A55C1





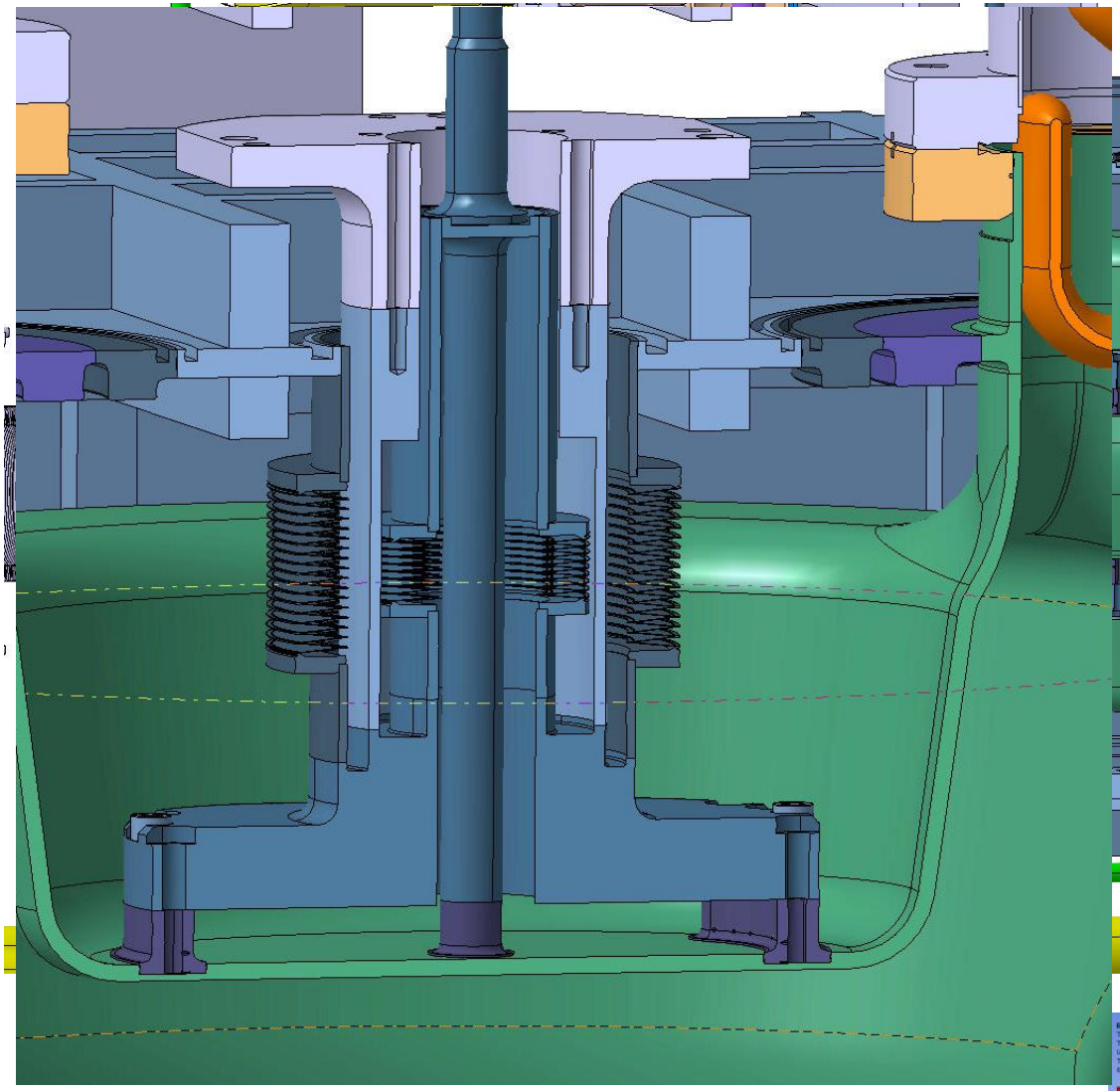
SPS

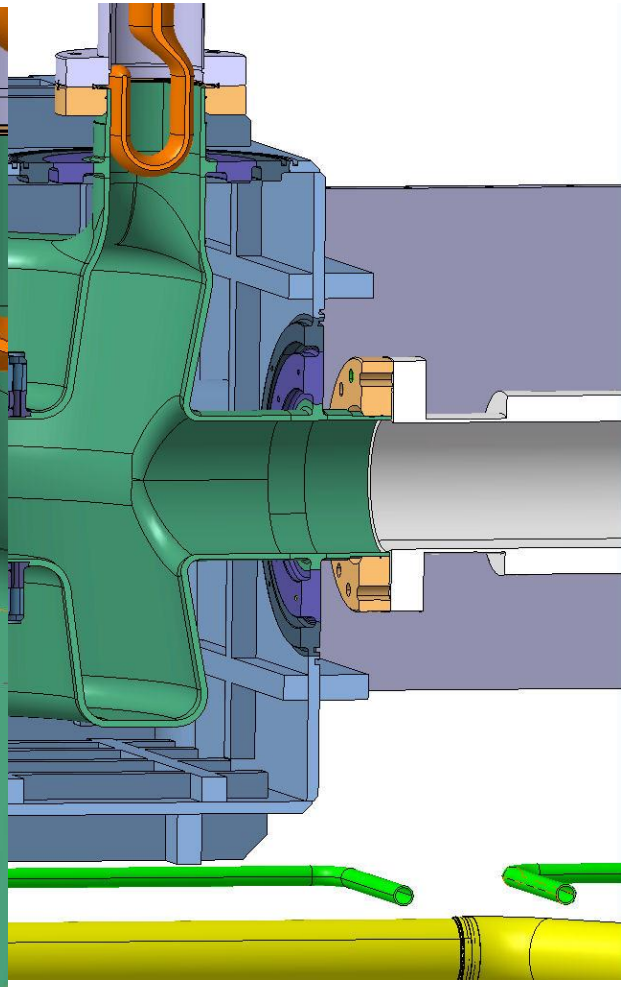
H under Rf guide :
DQW 346 mm
RFD 351 mm
Height motor SM18
489 mm

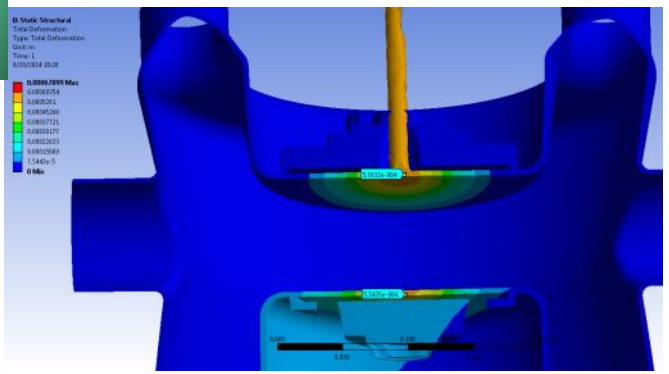
2 Solutions in work/study :

1. Motor + HD + RS horizontal + added scissor jack (ratio 5-10)

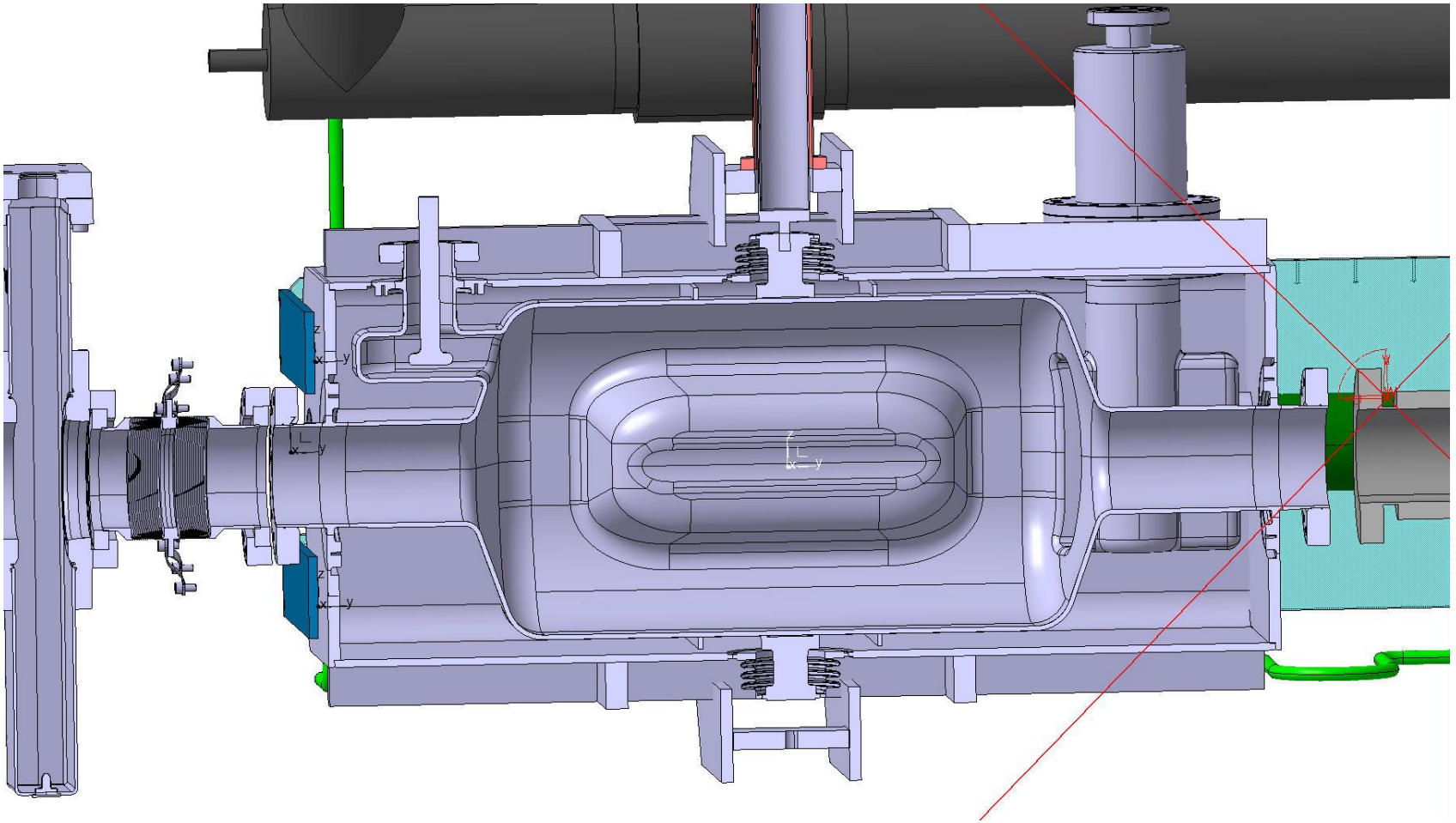
2. M+HD+RD stay vertical + added lever arm



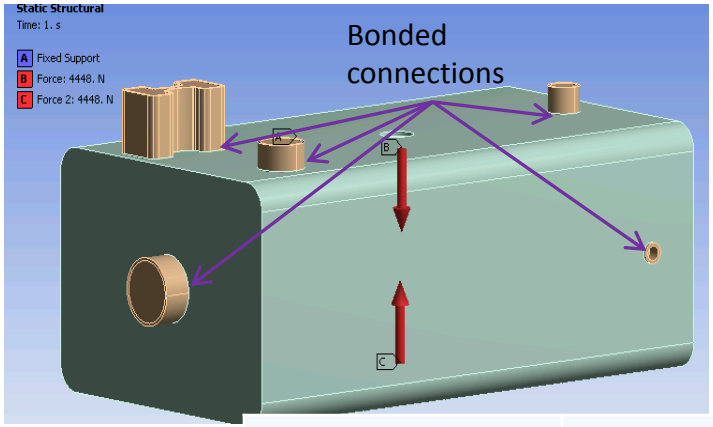




DQW range : 2 x 0.5 mm , force required 2.5 kN
1.6 MHz /mm



Characteristics – Tuning Sensitivity



Tuning force (N)	Tuning range (kHz)	Deformation each side (mm)	Peak Stress Intensity (MPa)	Sensitivity* (kHz/mm)
4448	730	1.057	368	690
1500	240	0.357	124	680

*** Sensitivity of tuner stroke 345 kHz/mm**

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4448	730	1.057	368	690
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