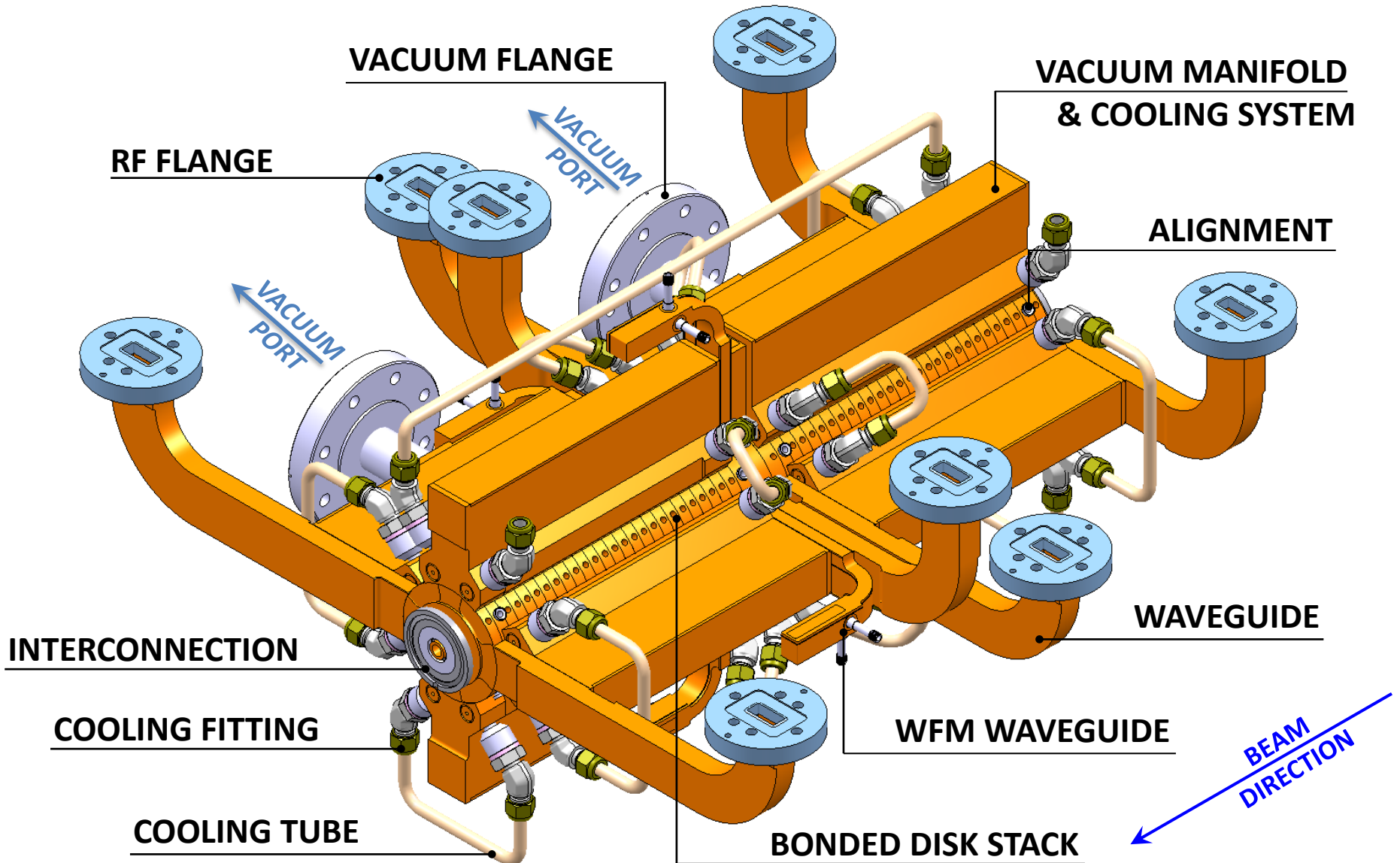




TD26 CLEX Structure

Design report

P. Piirainen

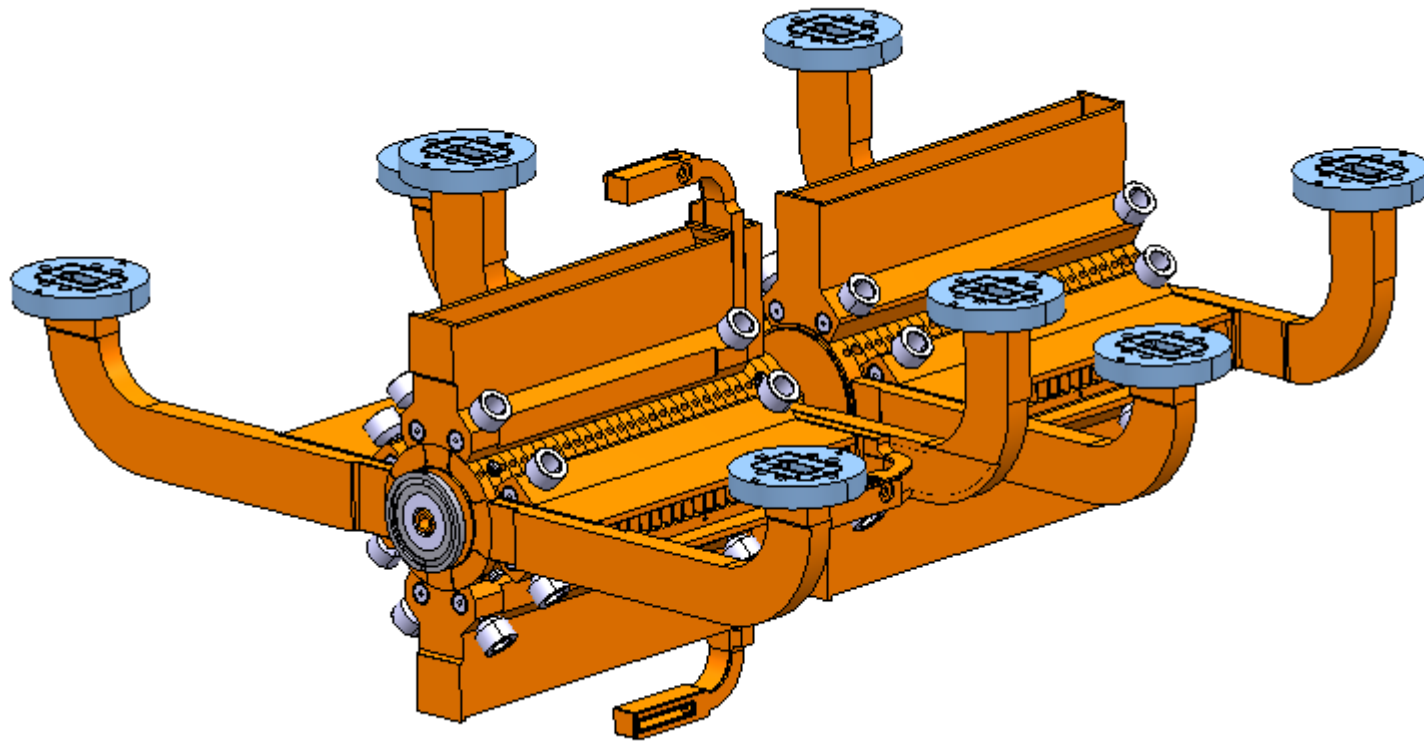


TD26 CLEX Super Accelerating Structure is an accelerating module with compact couplers and silicon carbide (SiC) damping material integrated. It consists of two accelerating structures bonded together and several features are integrated to meet RF and physical requirements for the structure.

The main task was to continue the engineering design for the TD26 CLEX structure and the following issues needed to be considered:

- Mechanical design of the wakefield monitors
- Mechanical design of the cooling system
- Mechanical design of the vacuum manifolds
- Mechanical design of the interconnections
- Implementation of the alignment features

- Super Accelerating Structure (SAS) has been formed by brazing two Accelerating Structure (AS) together

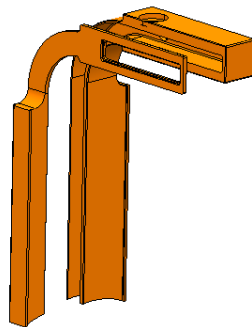


Main components and subassemblies for SAS, which will be assembled together

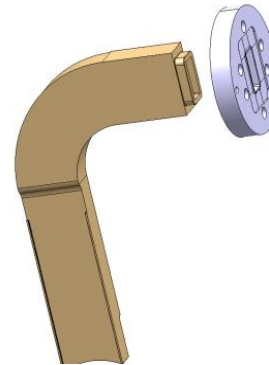
Bonded disk stacks



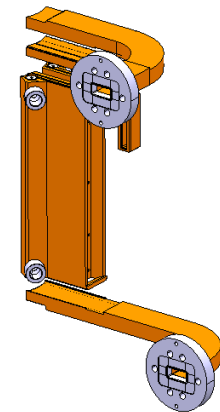
Wakefield monitor



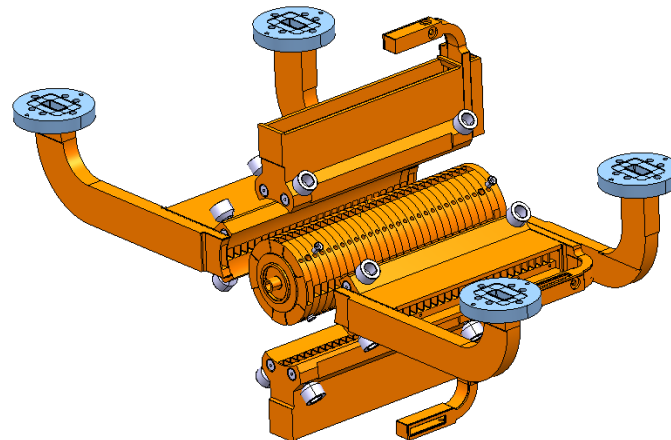
Waveguide



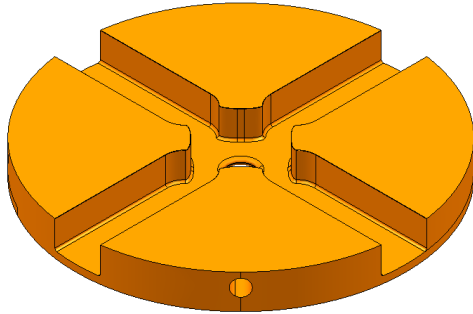
Manifold assembly



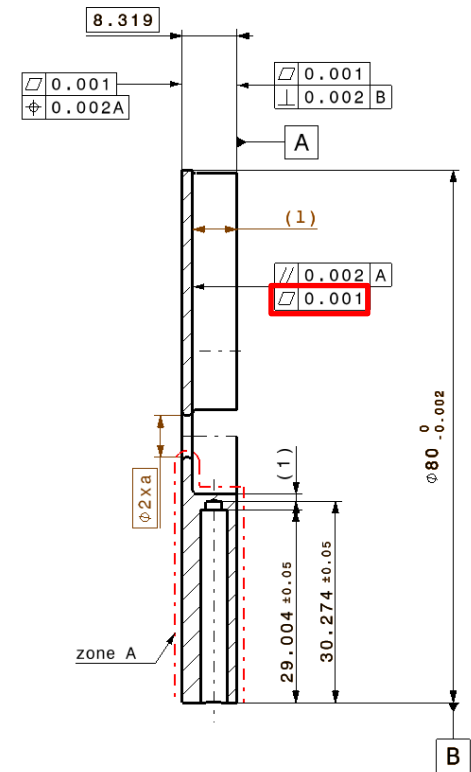
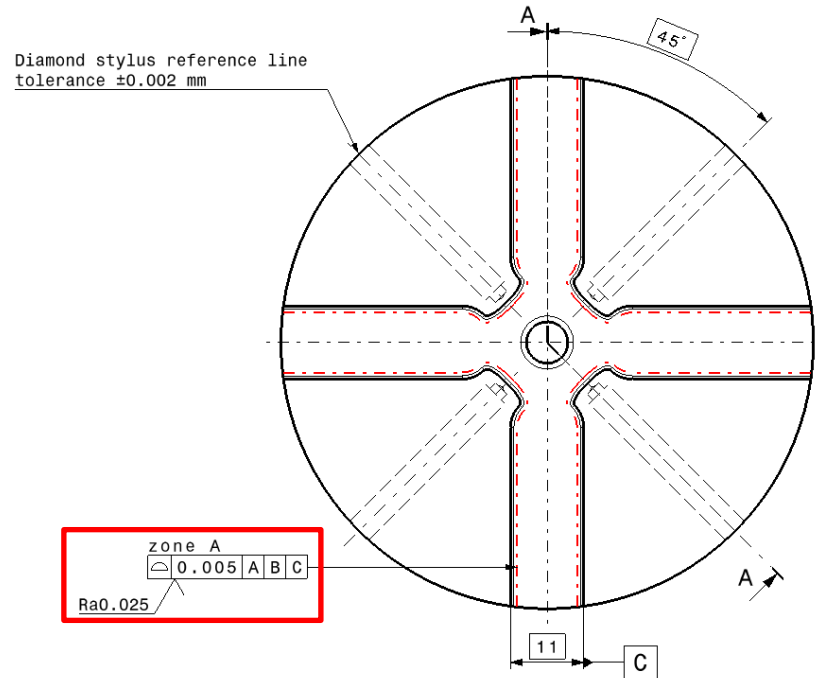
Disk stack and manifold assembly



REGULAR CELL

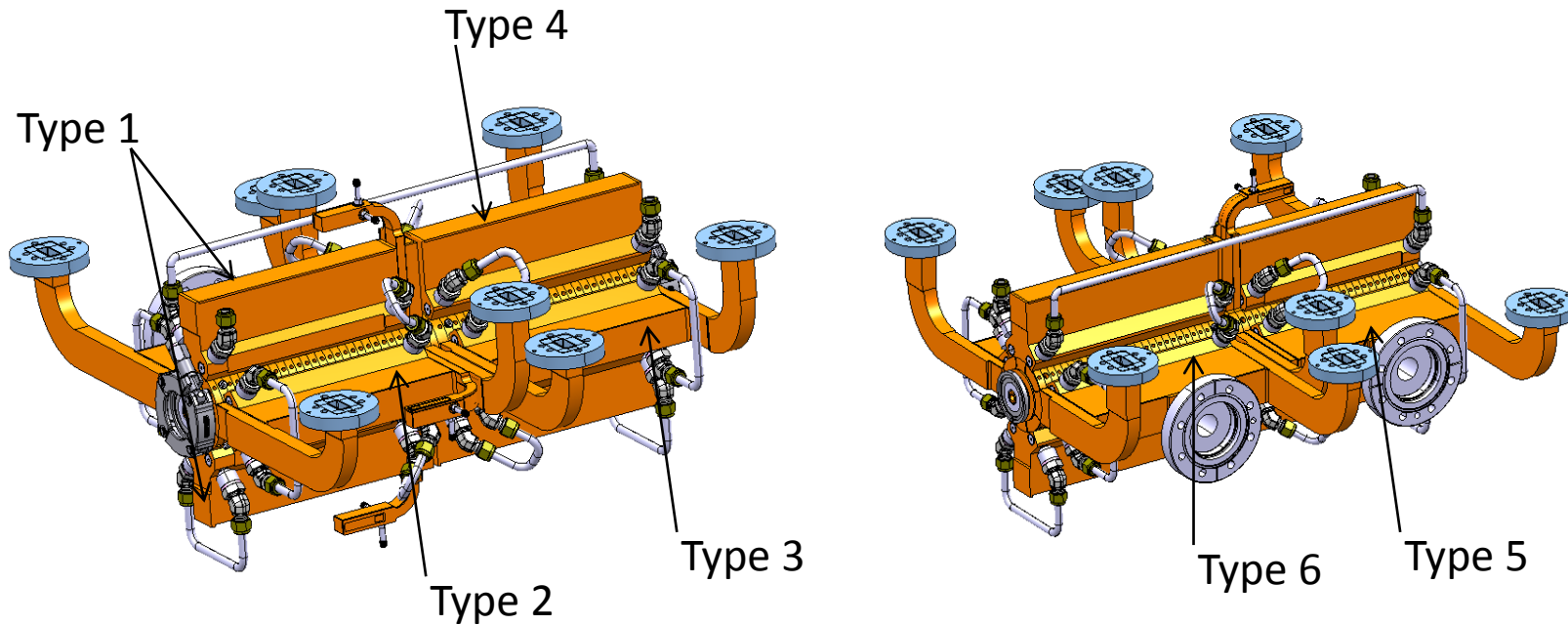


- Cell shape accuracy 0.005 mm
- Flatness accuracy 0.001 mm
- Cell shape roughness Ra 0.025 μm



Section view A-A
Scale: 2:1

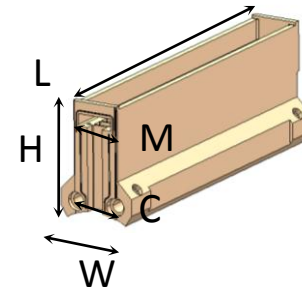
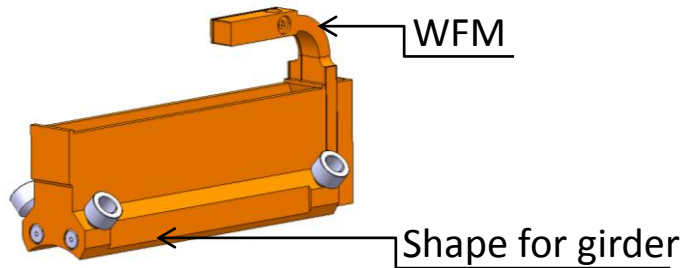
Vacuum Manifold design, 6 different types



Type 1

- Interface with wakefield monitor (WFM)
- With shape for assembling on girder

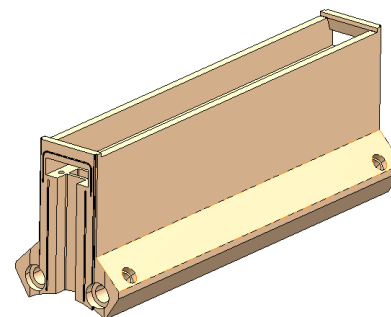
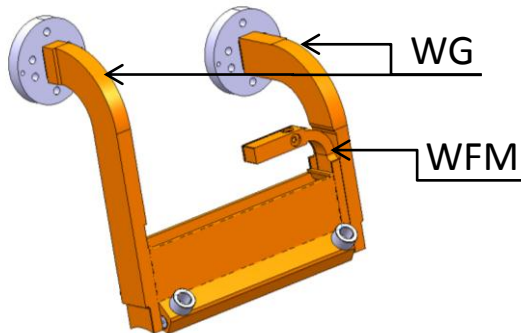
Length L	Width W	Height H	Manifold W	Cooling dist
218.6	52	76	32	29



Type 2

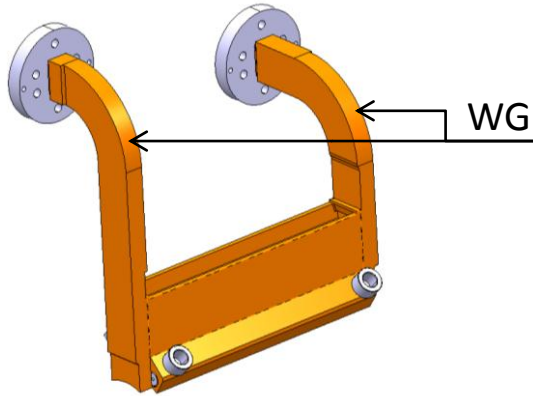
- Interface with wakefield monitor
- Interface with waveguide (WG)

Length L	Width W	Height H	Manifold W	Cooling dist
207.0	58	76	32	35

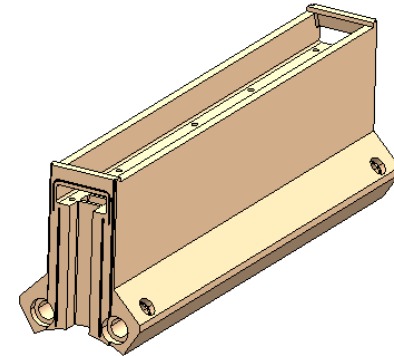


Type 3

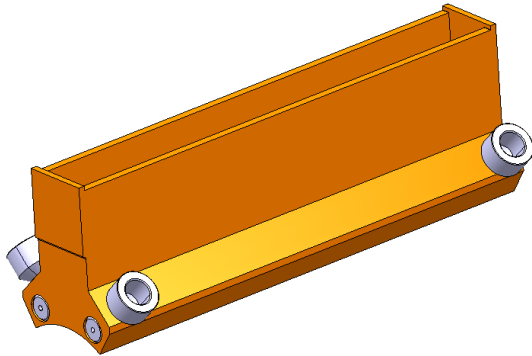
- Interface with waveguide



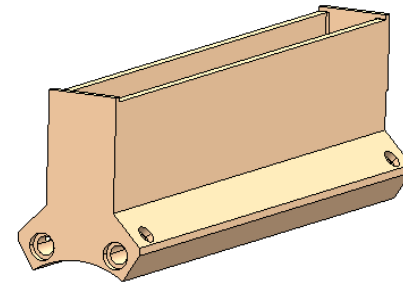
Length L	Width W	Height H	Manifold W	Cooling dist
215.3	58	76	32	35



Type 4

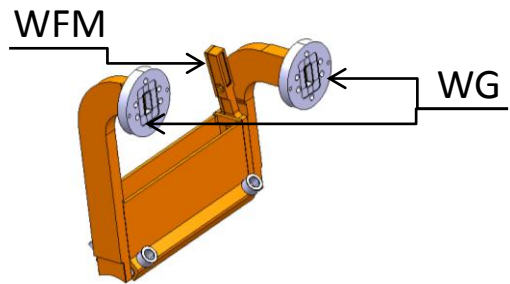


Length L	Width W	Height H	Manifold W	Cooling dist
237.3	58	76	32	35

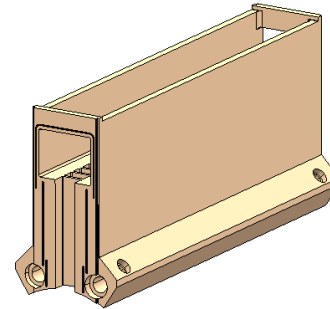


Type 5

- Interface with wakefield monitor
- Interface with waveguide
- Pumping the SAS

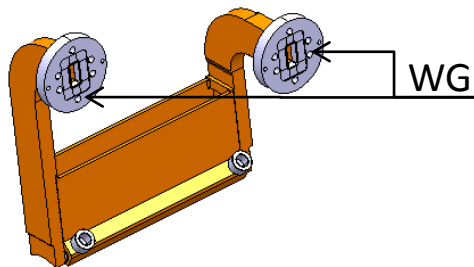


Length L	Width W	Height H	Manifold W	Cooling dist
207	58	94	38	35

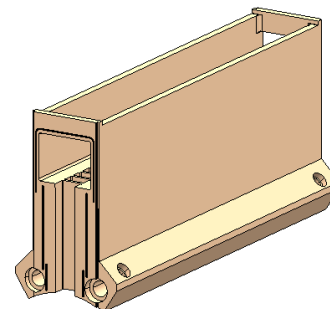


Type 6

- Interface with waveguide
- Pumping the SAS



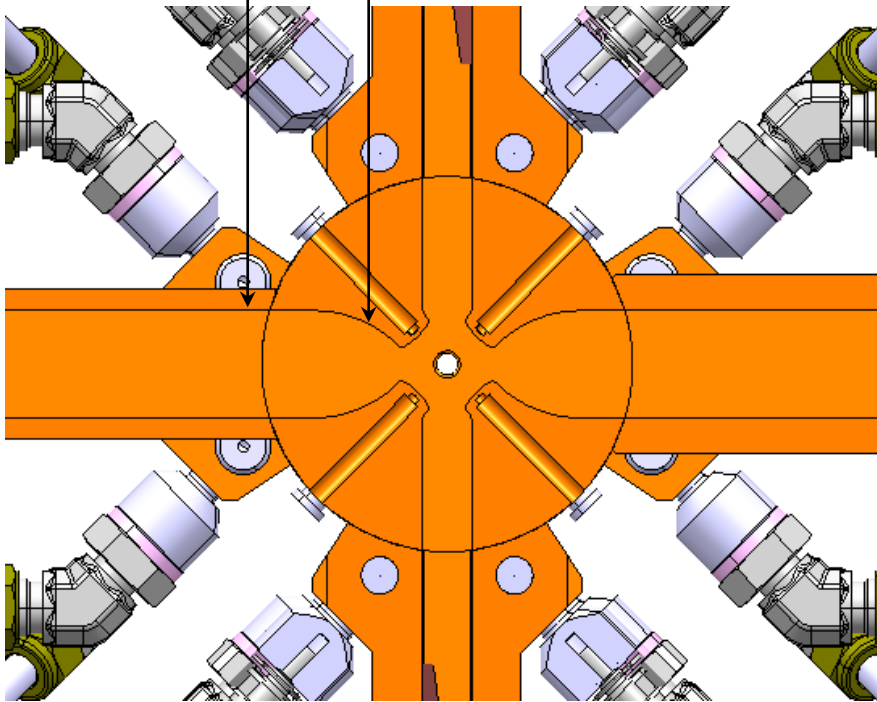
Length L	Width W	Height H	Manifold W	Cooling dist
215.3	58	94	38	35



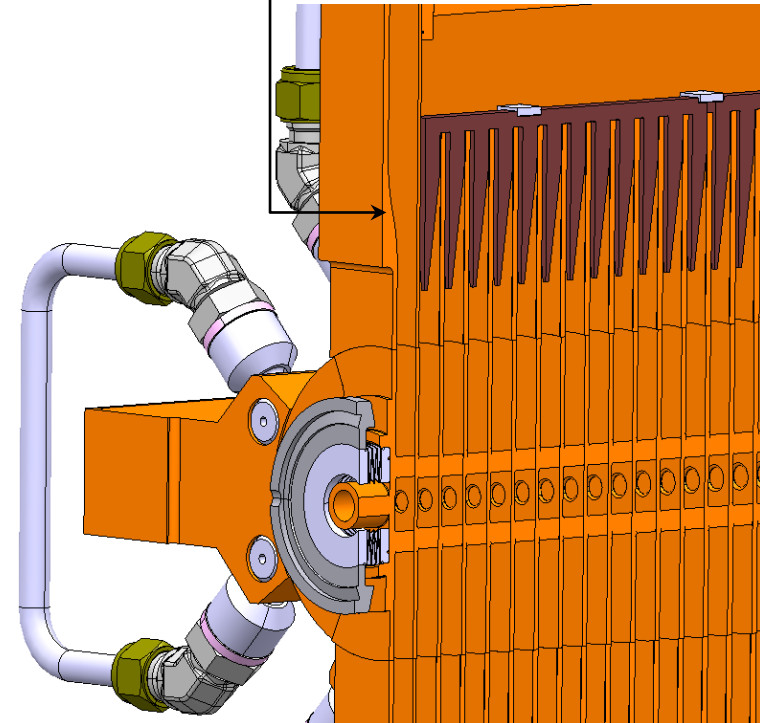
Compact Coupler Design

Compact couplers and new design waveguides have been integrated to the disk structure

Compact coupler waveguide/disk

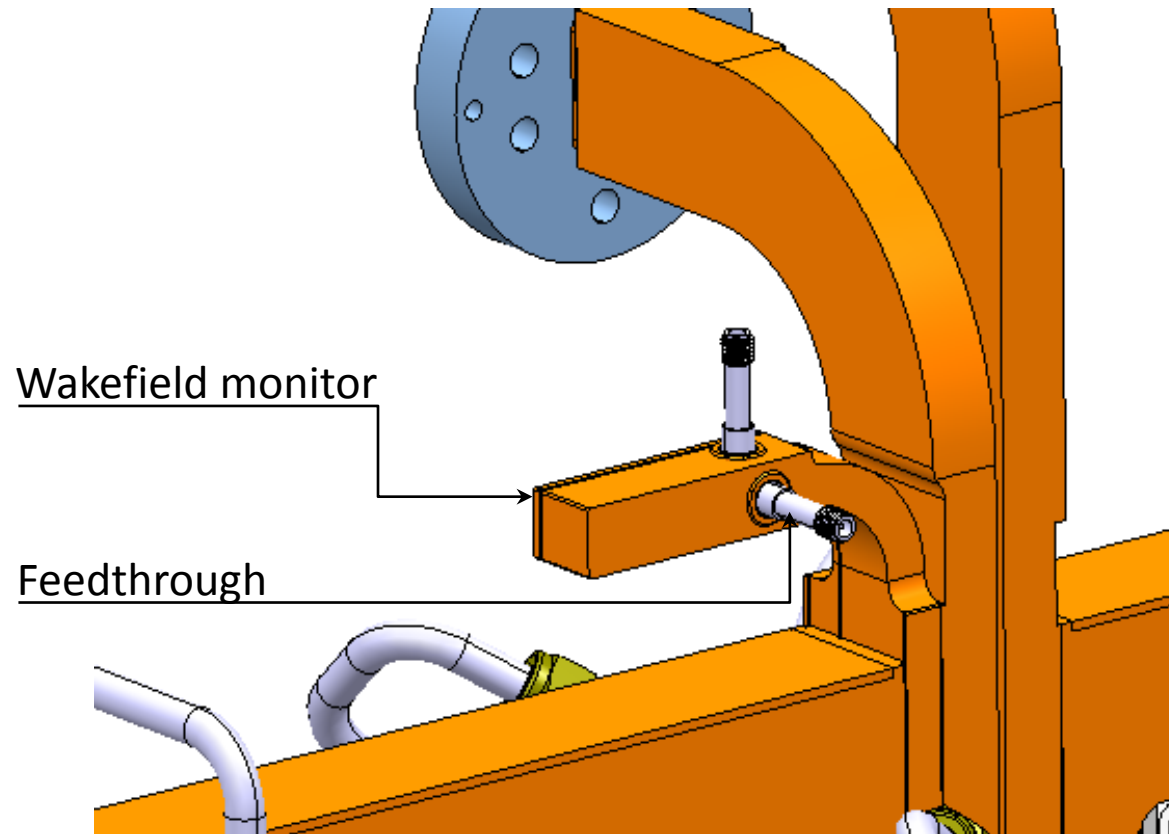


Waveguide with special shape



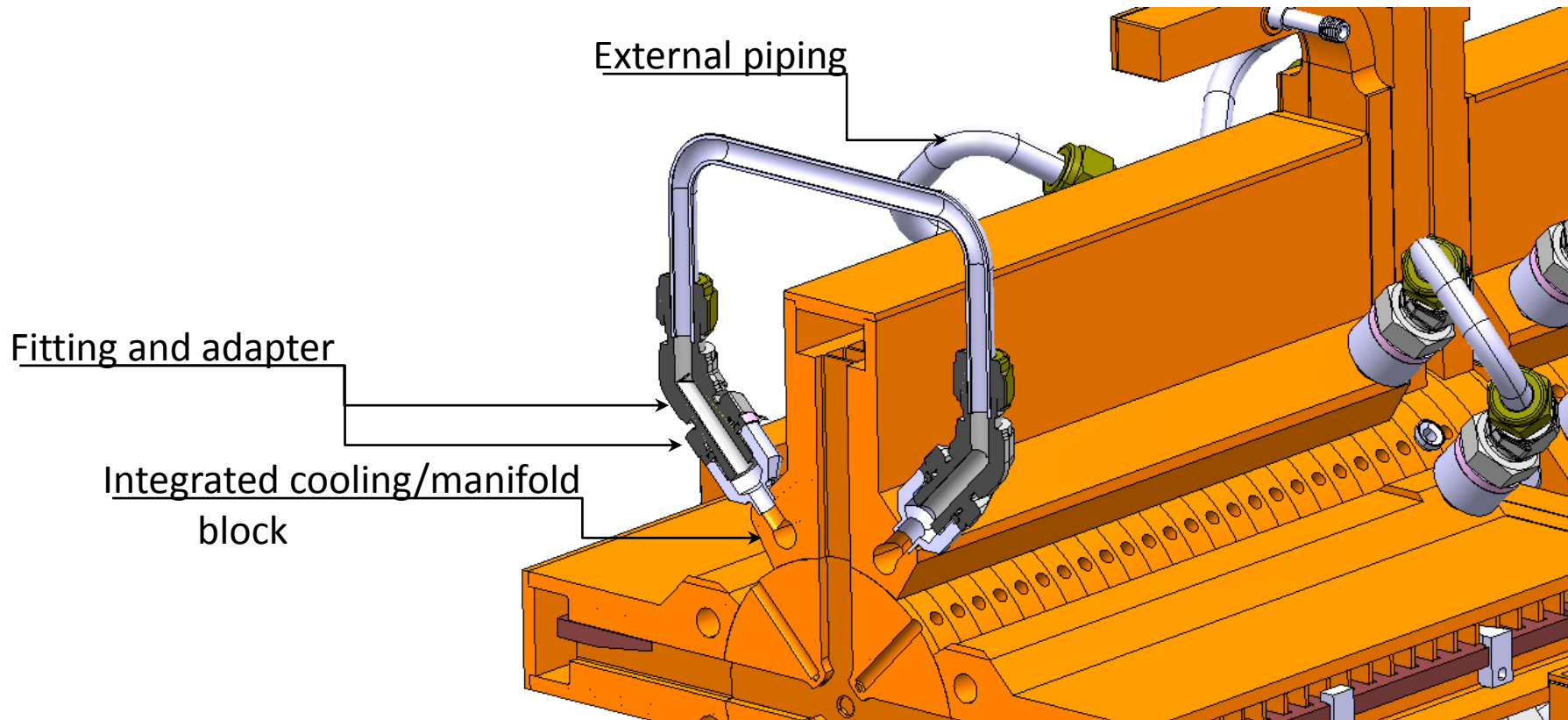
Wakefield Monitor Design

Wakefield monitors with feedthroughs have been integrated to the structure



Cooling System Design

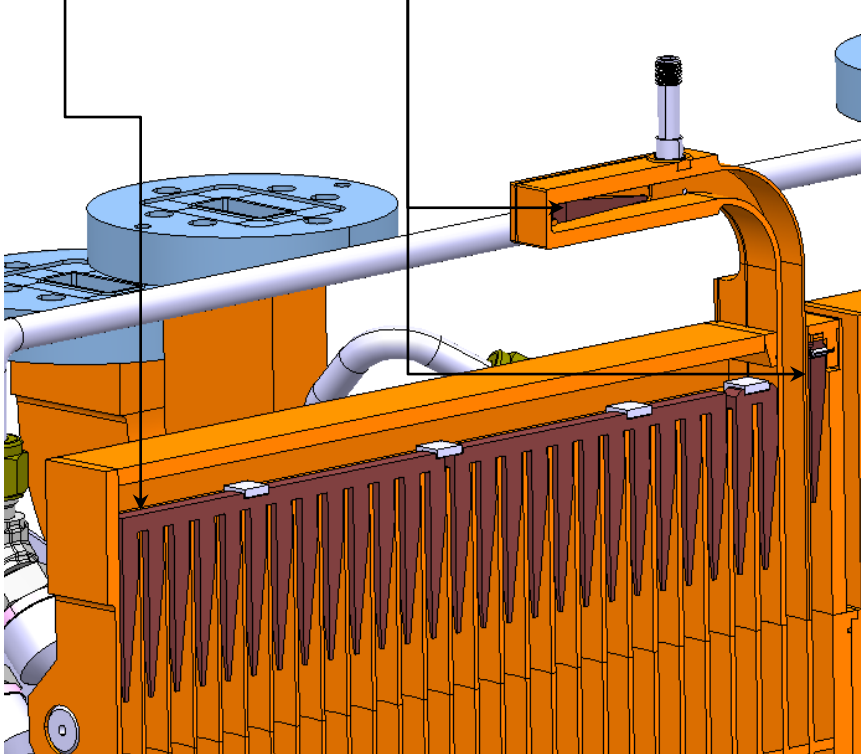
- Cooling system has been integrated to vacuum manifolds
- External piping has been implemented with standard fittings and pipes



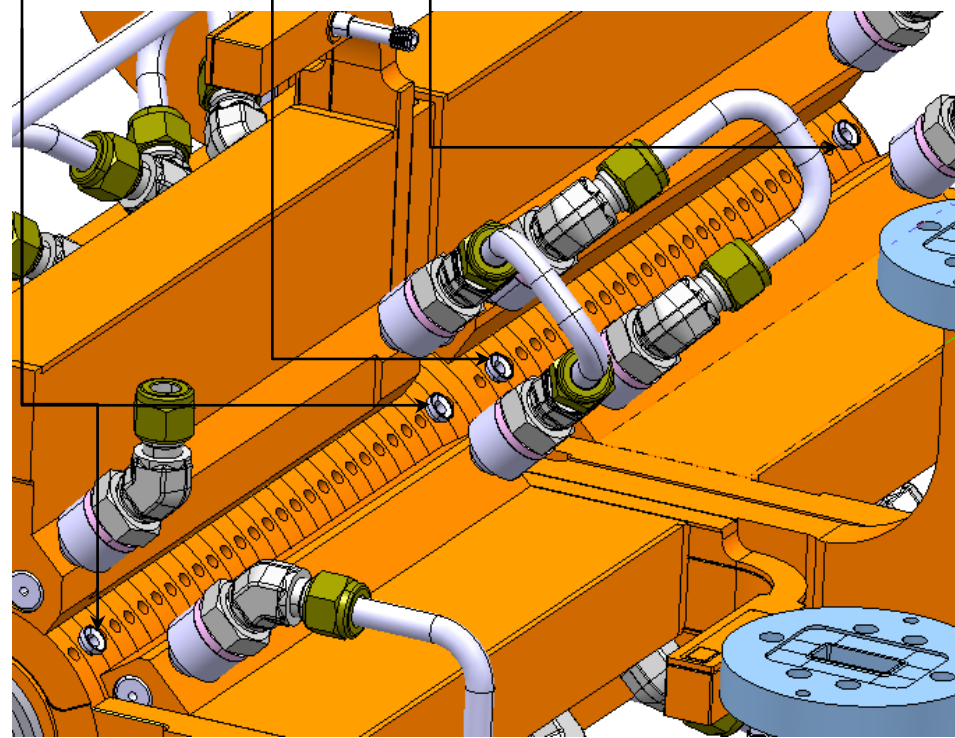
Damping and Alignment Design

Damping material has been integrated to the vacuum manifolds and WFM waveguides
Alignment inserts have been included to design

Damping material



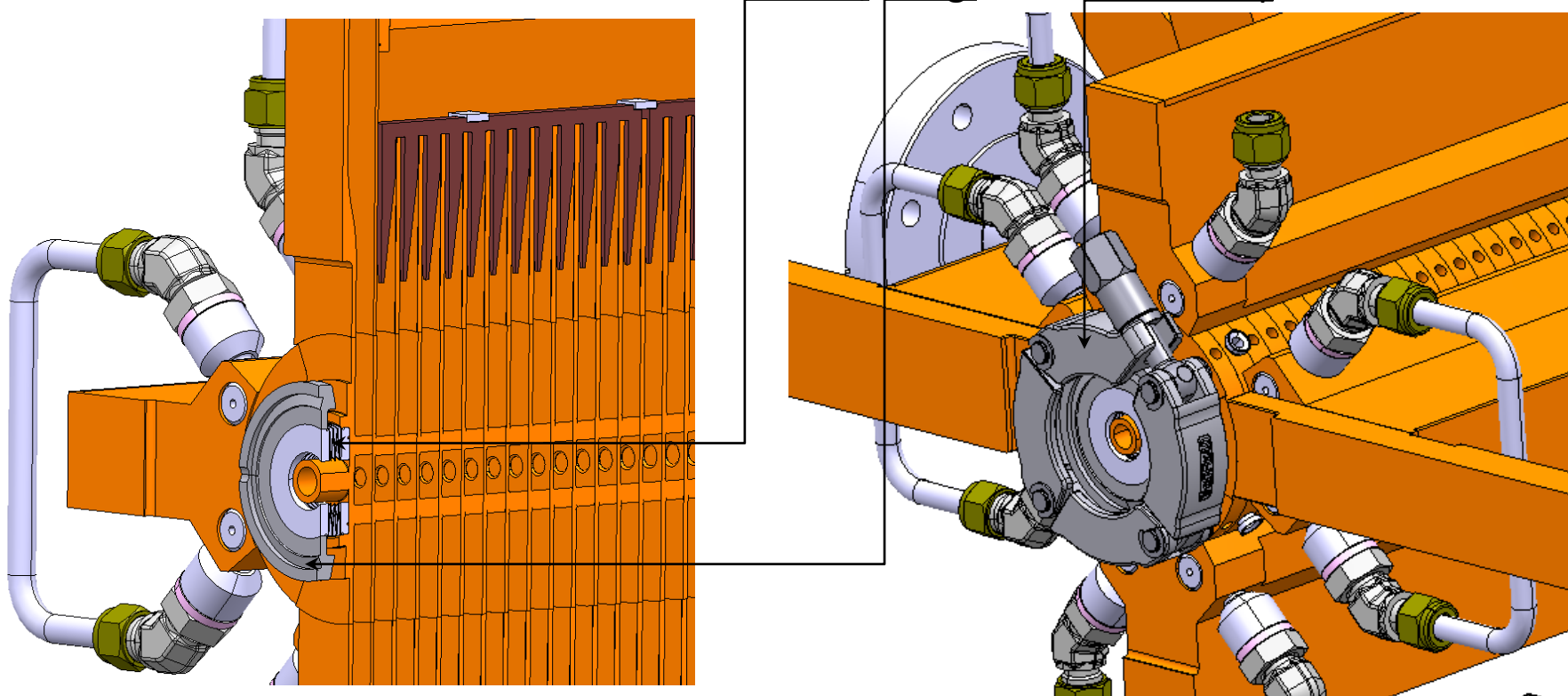
Alignment inserts



Interconnection Design

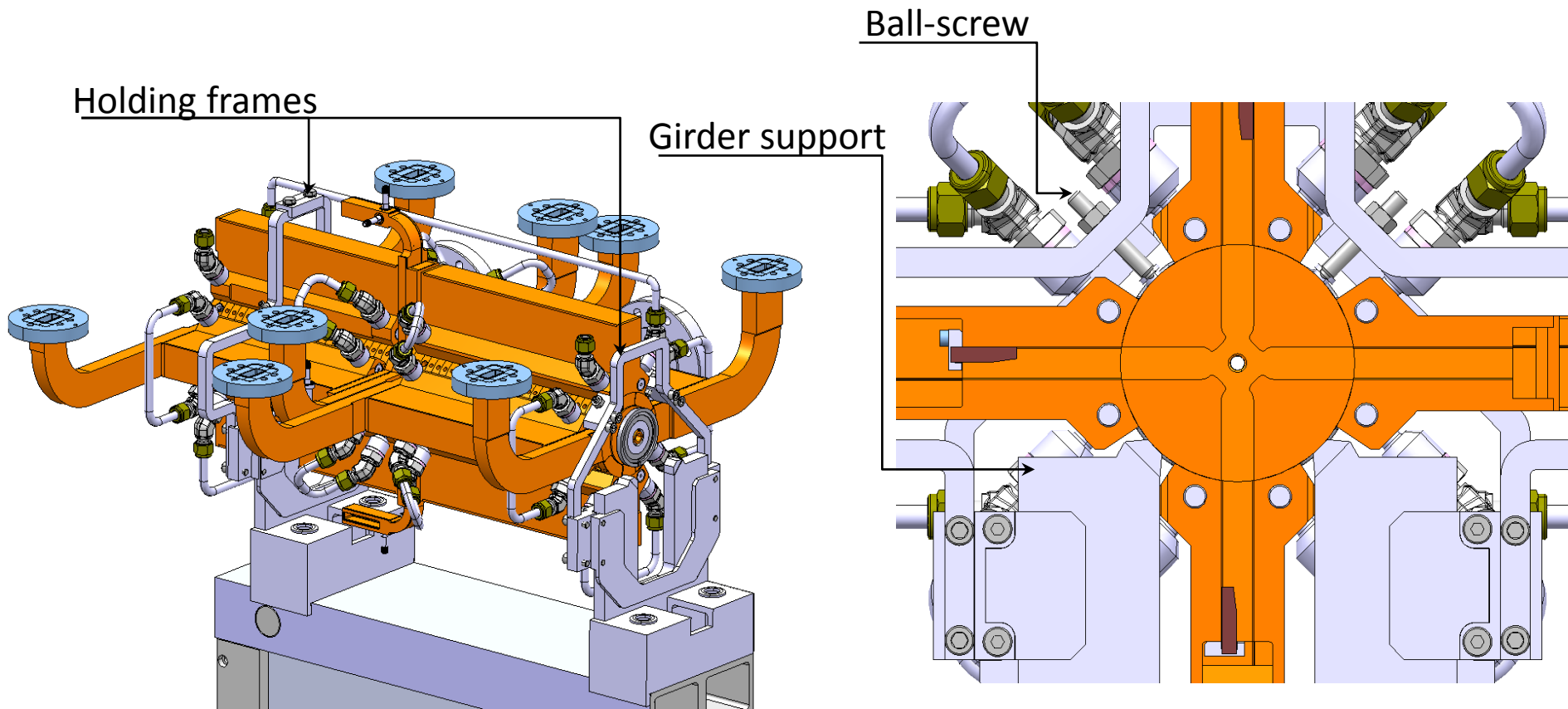
Super Accelerating Structure has been designed so that it is able to assemble to adjacent structures with flexible interconnections

Interconnection with bellow, flange and chain clamp



Supporting System

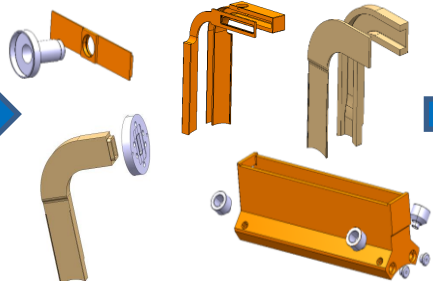
Super Accelerating Structure has been fitted on the girder



1. Diffusion bonding disks



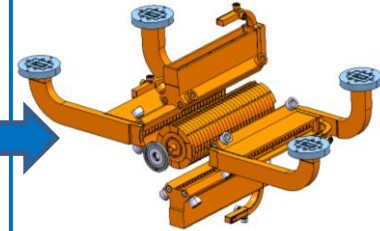
2. Pre-assembling and brazing of manifold cover wakefield monitor, waveguide and cooling parts



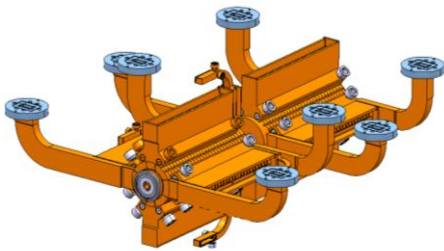
3. Brazing pre-assemblies to vacuum manifold



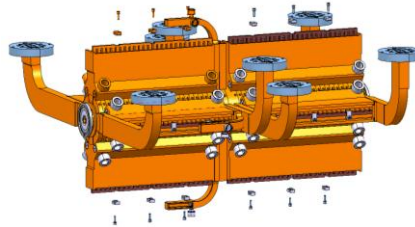
4. Brazing of manifolds, disk stack and interconnection flange



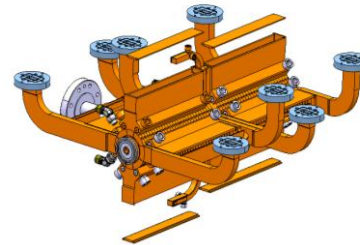
5. Brazing two AS assemblies to form a super accelerating structure



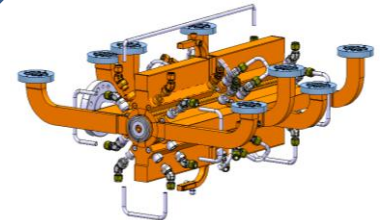
6. Installation of damping loads



7. EBW welding of manifold covers and vacuum flanges



8. Installation of tube connectors and tubes





THANK YOU!