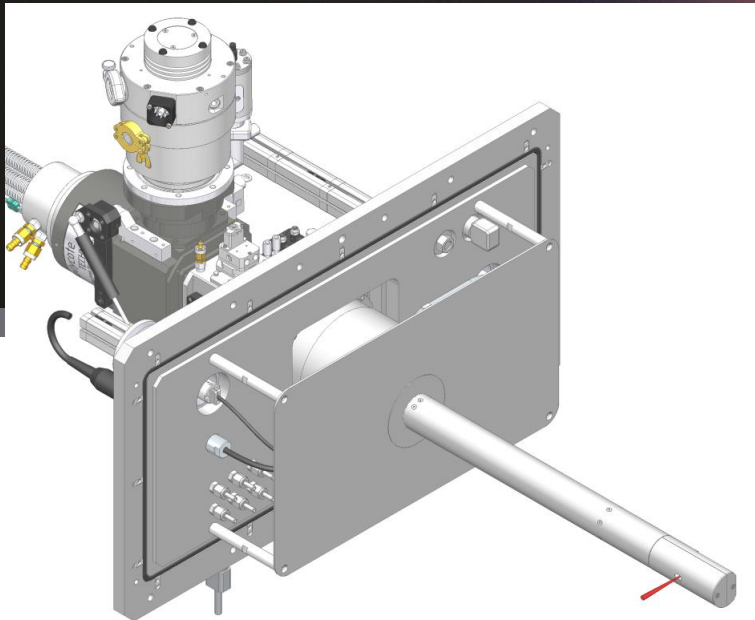
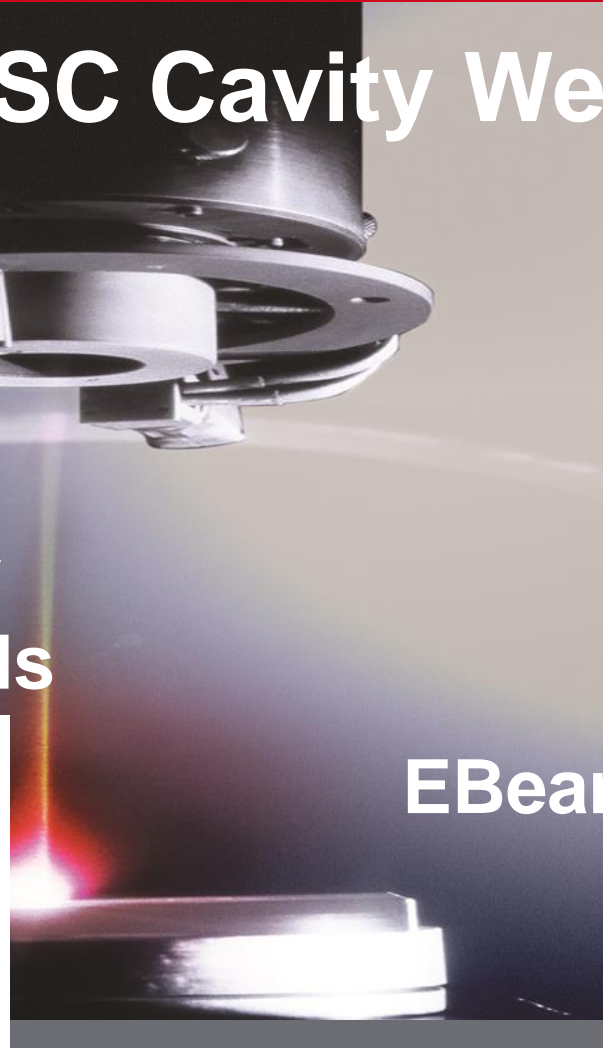


Electron Beam SC Cavity Welding

90° Deflection Tool for
Inside Equatorial Welds



EBeam Analyser



Dr. Peter Oving

WELDING WORKSHOP & CUSTOMER SUITED MACHINES



Half a century of expertise at your service

More than 400 machines all over the world

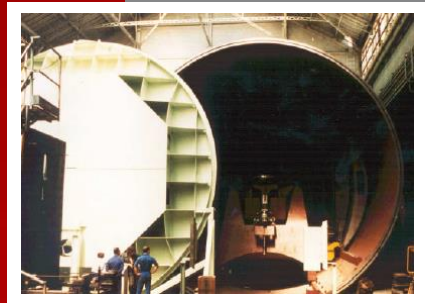
An integrated facility with 18 welding machines

- ISO 9001
- EN 9100
- NADCAP

Engineering of toolings or welding machine dedicated to your Application

China and India technical & sales Teams

Hotline for fast diagnose and troubleshooting on site.



800 m3 Chamber
French Navy



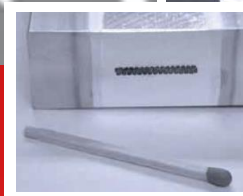
Ariane Booster Welding

Accredited Training Centre for EB welding. Usage and maintenance of welding machines

Upgrading old welding machines from any Suppliers



Many tools for weld inspection (X-ray, eddy current, ultrasounds, penetrant testing)



CERN CMS SC-Stripwelding

2003 Crystal Award of the year



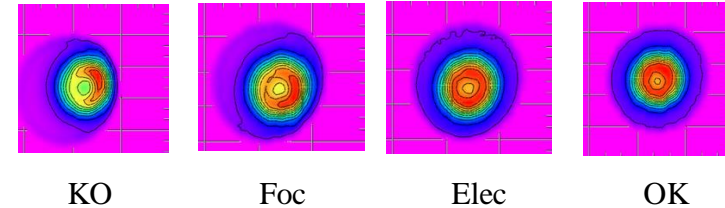
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Cavity welding tool development

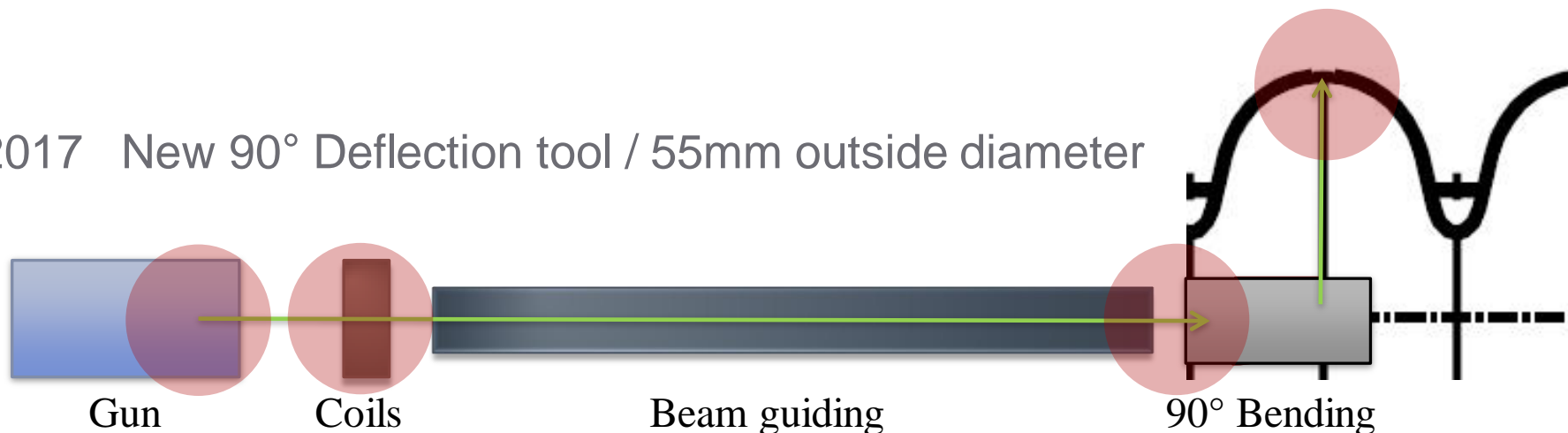
- 1993 Inside welding of large diameter cavities
 90° Deflection tool / 120mm
 2013 90° Deflection Tool / 72mm outside diameter

2016 New concept Beam Analyser System

- Free fall position => No beam deflection
- Electrode alignment optimisation
- ⇒ Miniaturisation of Deflection tool
- ⇒ Control of final deflected beam parameters



2017 New 90° Deflection tool / 55mm outside diameter

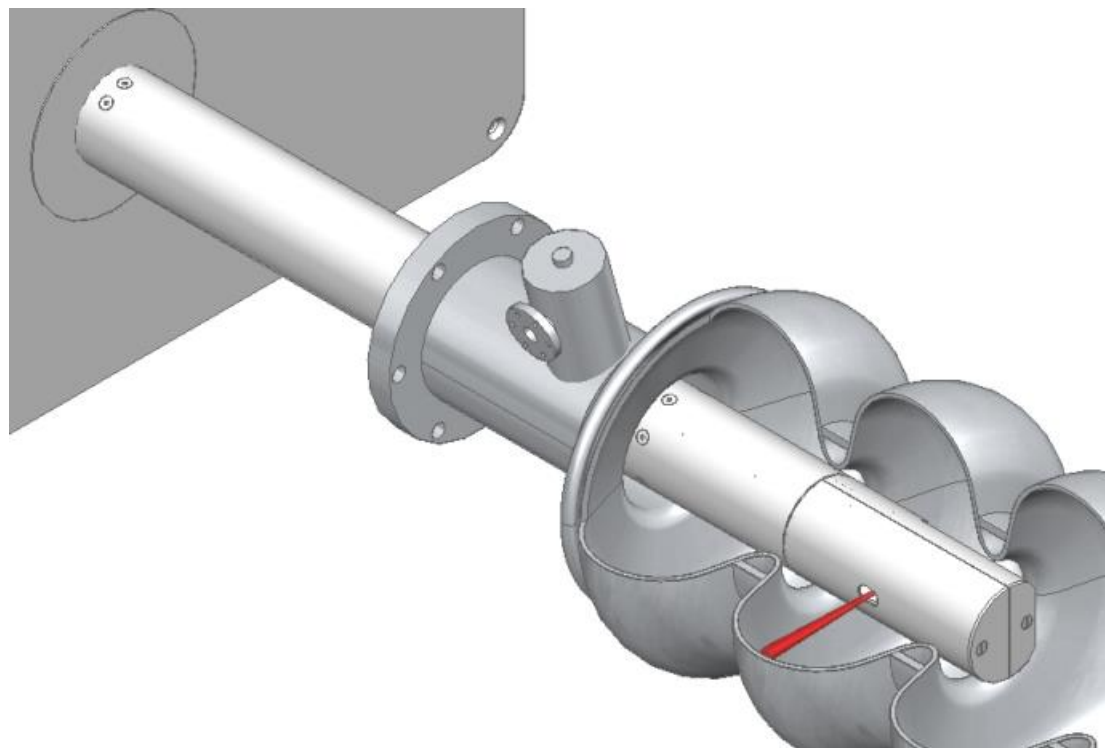
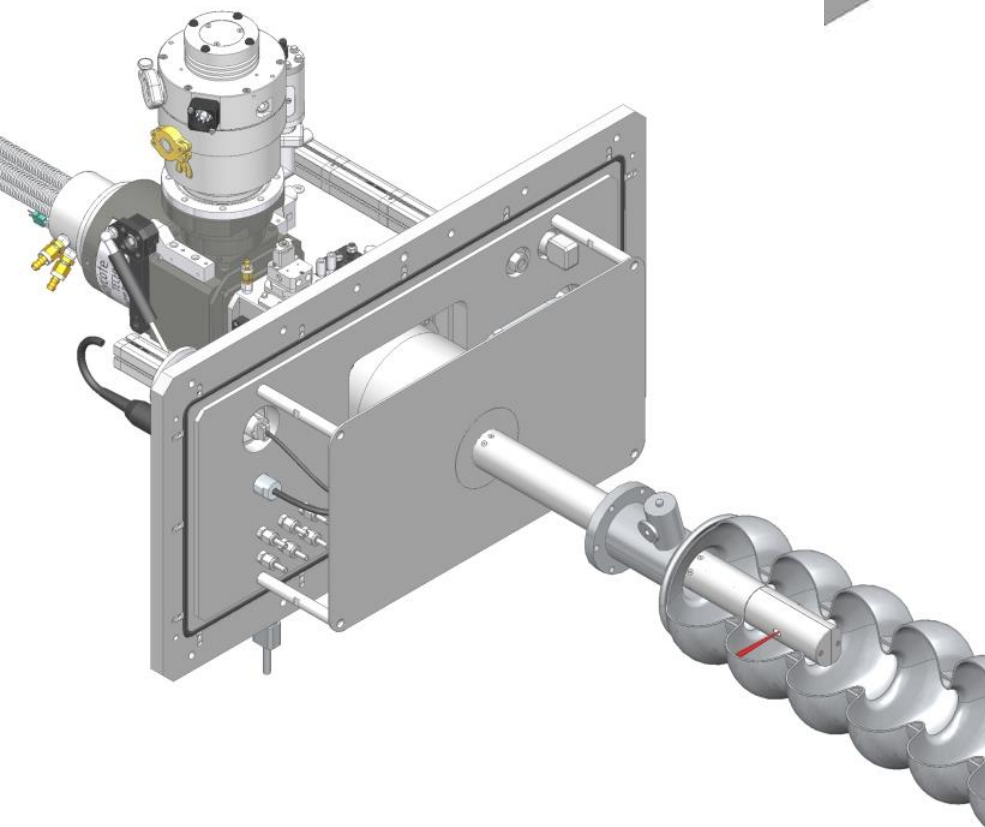


New D55mm - 90° Ebeam Deflection Unit

TECHMETA
Bodycote

Characteristics:

- 6kW
- 60kV / 100mA
- 55mm overall diameter
- 600mm length or more
- Endoscopic vision system



Features:

- Inspection of inside surfaces
- Automatic beam alignment
- Beam analyses by TechScan
- Vibration perpendicular to seam
- Same vacuum

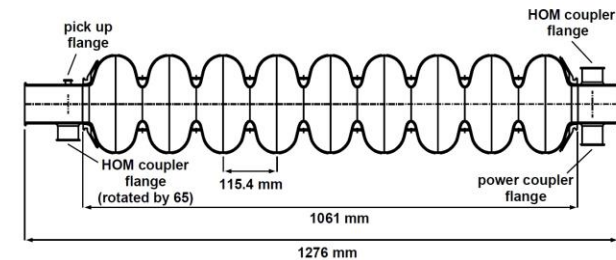
Cavity Welding Process Parameters

DESI developed process:

- Dumbbell cavities + End pieces => Iris Inside Weld
 - Complete 9 cell assembly => Equatorial Outside Weld
- Best Iris surface quality possible
- Good quality of inside equatorial seam

Rejects still possible:

- unacceptable weld seam defects
- inside equatorial surface defects

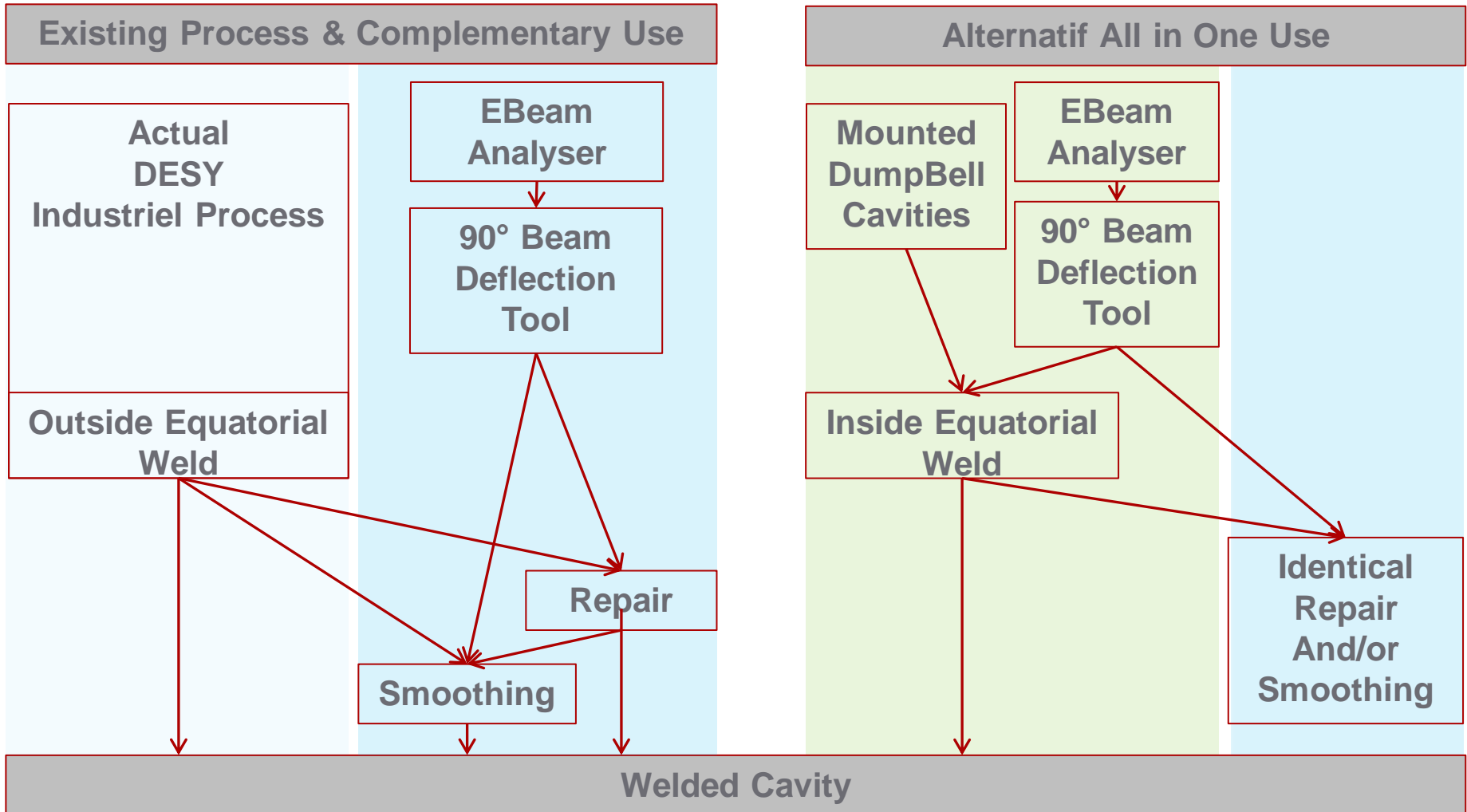


Solution = Inside surface remelt by 90° welding tool ?

- New way to repair inside surface defects
- New way to assure constant cavity surface quality

Combined Tool Operation

NB: Tool use is based on use of dumb bell cavities realised by proved inside iris welding



Summary / Outlook

Uses:

- Inside Weldseam Repair
- Inside Surface Smoothing
- Inside Equatorial Welding

Pros:

Lower power input

Controlled Parameter Set through Beam Analyser

- Constant Inside Surface Finish
- Optimal Cavity Characteristics

Inspection of inside equatorial weld seams

- Cost reduction by inside repair
- Cost reduction by inside smoothing

Operations in same vacuum

D55mm 90° Welding tool

+

TechScan Beam analyser

=

Alternatif / Complementary Process?

Shall we try?

Thank you for your attention



Controlled:

- Inside welding
- Inside smoothing
- Inside repair

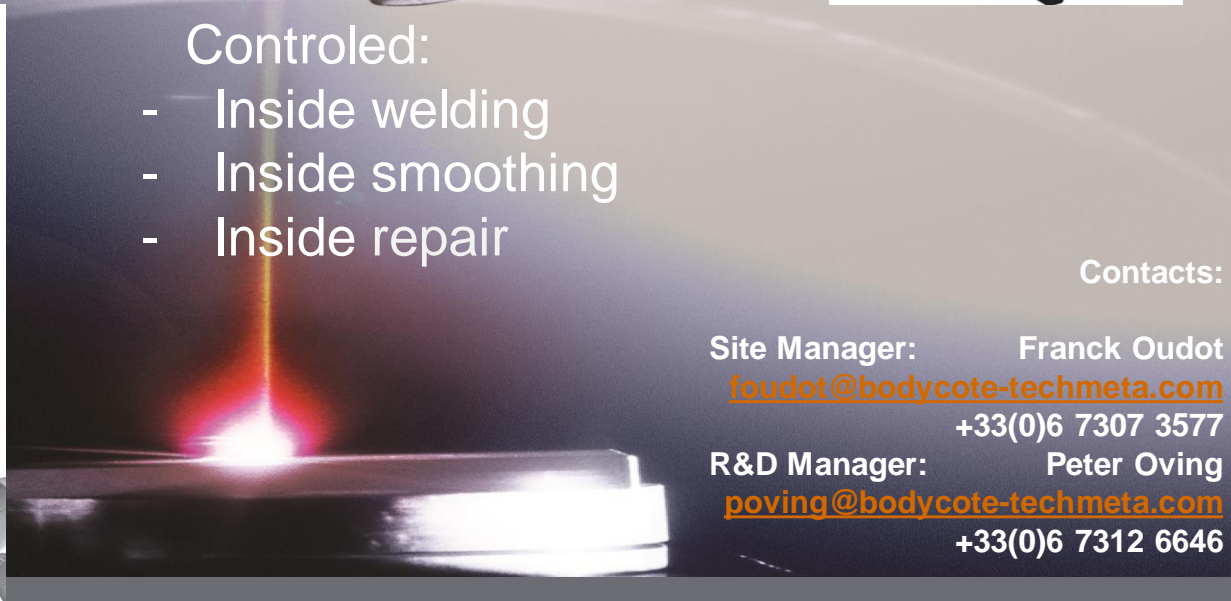
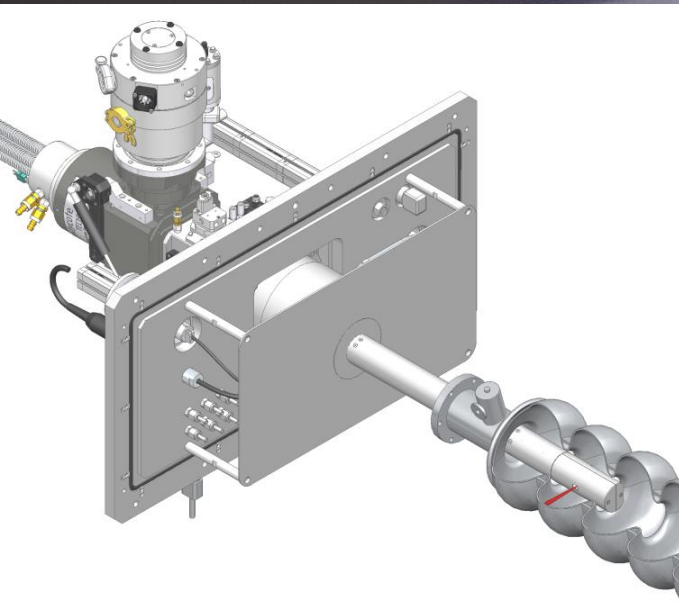
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