



# TCTPV - TCTPH - TCLX

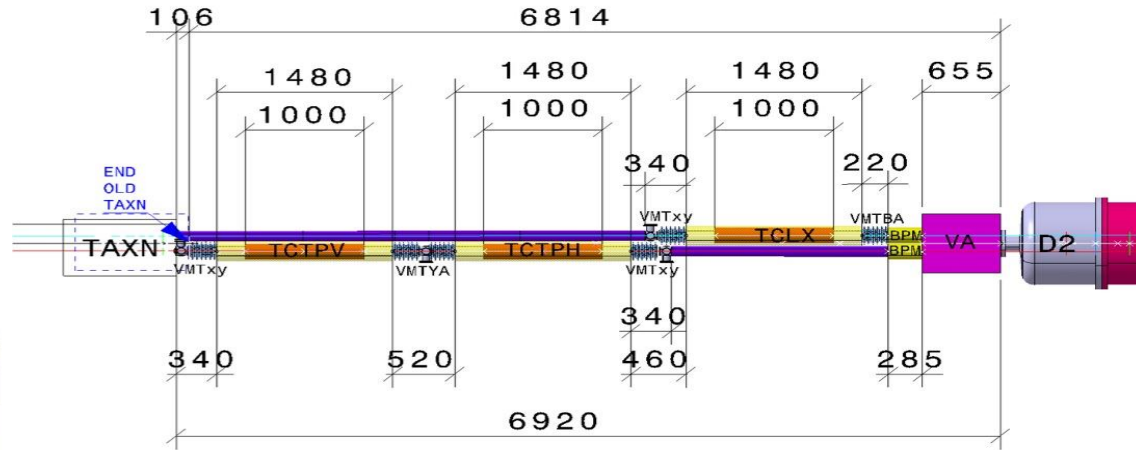
## Update of collimator designs between TAXN and D2

HL-LHC Integration Meeting

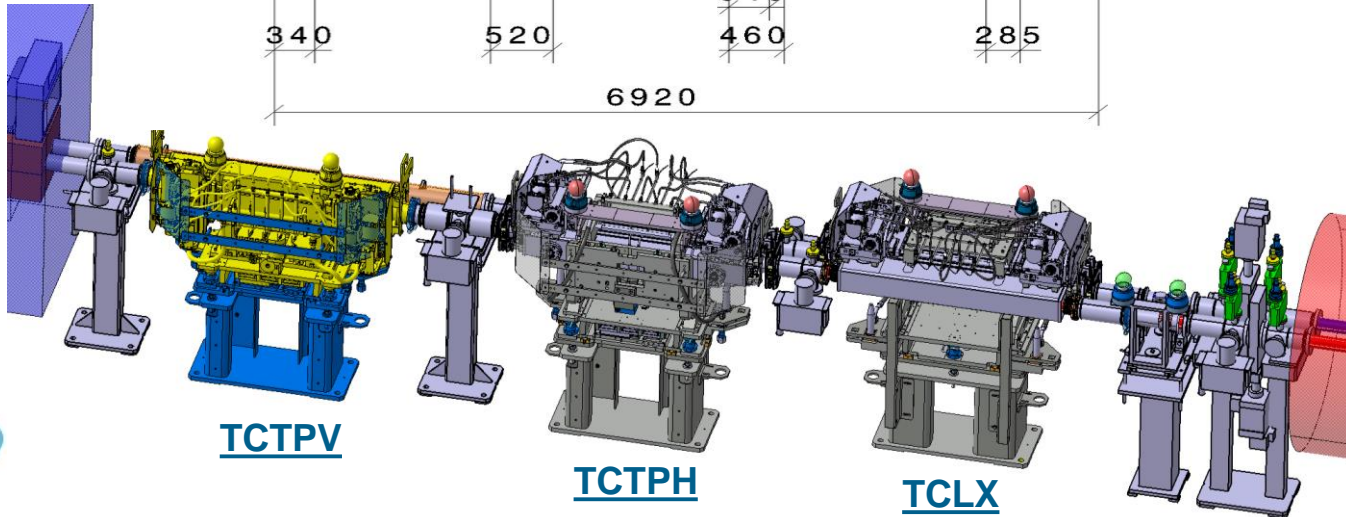
**L. Gentini, A. Bertarelli, F. Carra**



# TAXN → D2 AREA



TAXN



D2

# FUNCTIONAL SPECIFICATIONS

	TCTPV	TCTPH	TCLx
<b>Orientation</b>	Vertical	Horizontal	Horizontal
<b>Absorber Material</b>	Inermet IT180	Inermet IT180	Inermet IT180
<b>Absorber Cross-section</b>	34 x 20 mm <sup>2</sup>	34 x 20 mm <sup>2</sup>	70 x 40 mm <sup>2</sup>
<b>Jaw Stroke</b>	40 (+5) mm	30 (+5) mm	30 (+5) mm
<b>Interference* with present layout</b>	<b>11.3 mm</b>	<b>43 mm</b>	<b>58.1 mm</b>

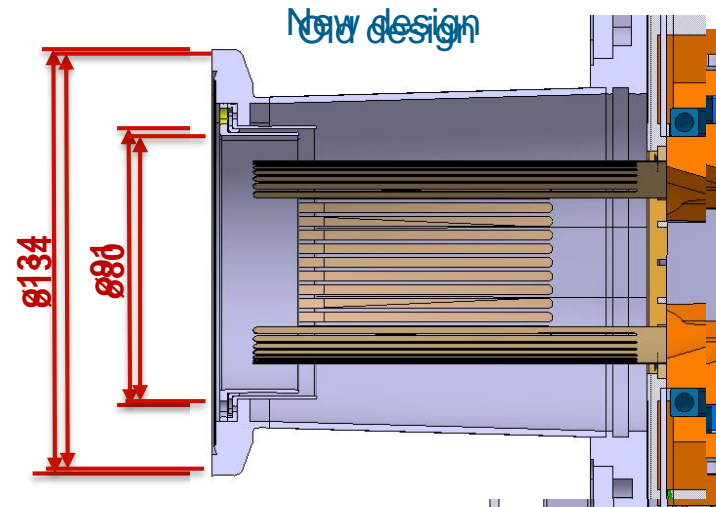
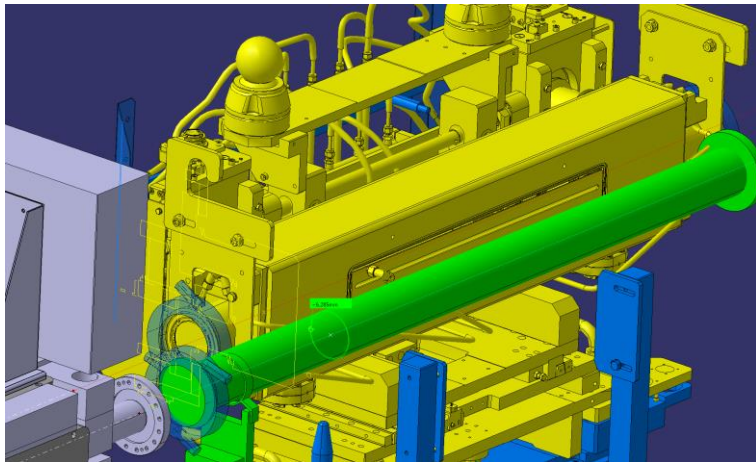
\* Interference calculated assuming a **standard collimator tank** and including baking equipment thicknesses (tank jacket thickness 25 mm and/or vacuum chamber wrapping 5 mm) and a **new ID/OD 91/95 mm vacuum chamber.**

A. Bertarelli's presentation  
5-2-2016

Source: A. Rossi (BE/ABP)  
N. Joannon (EN/ACE)

# TCTPV – NEW DESIGN

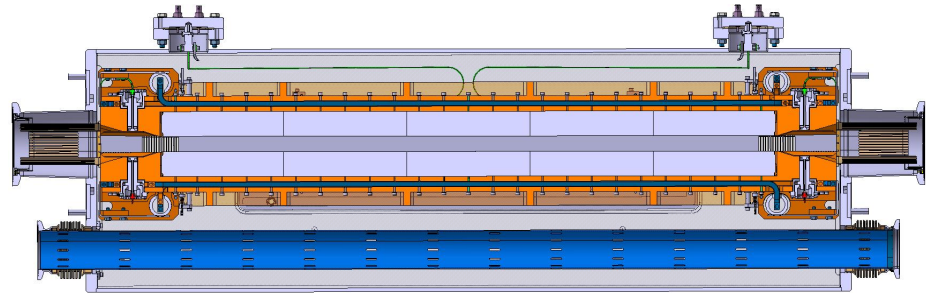
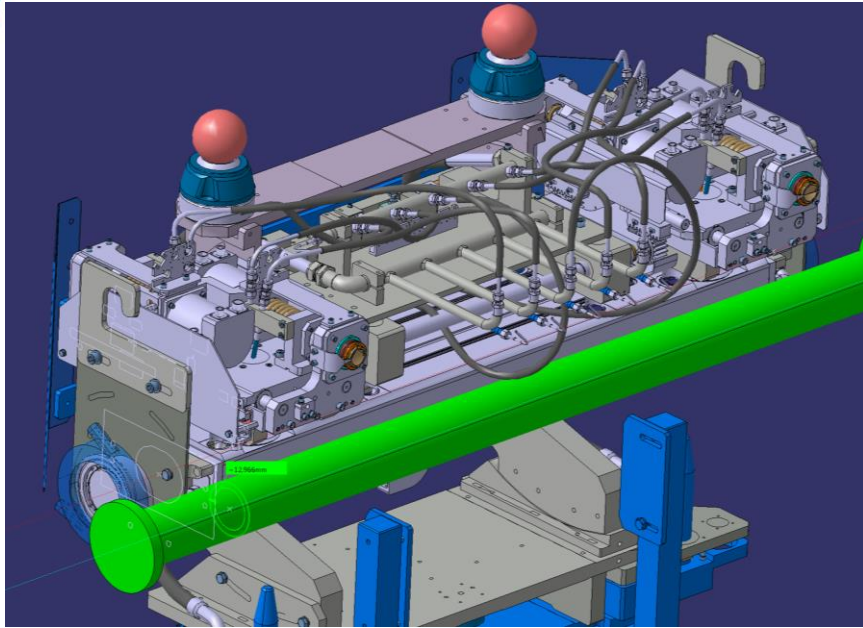
VACUUM VESSEL	JAW	MECHANICAL TABLE	TANK SUPPORT	APERTURE
<b>NEW Type A:</b> 20 mm bigger Bellow bigger	Standard TCTP	<b>NEW Type A</b> Stroke +40 ; -5	Standard TCS	Coll. beam $\varnothing 91$ mm
<b>NEW Type B:</b> Bigger bellow	<b>NEW Type A</b> Back stiffener 10 mm thinner	<b>NEW Type A</b> Stroke +40 ; -5	Standard TCS	Coll. beam $\varnothing 91$ mm



New RF finger cycling test required

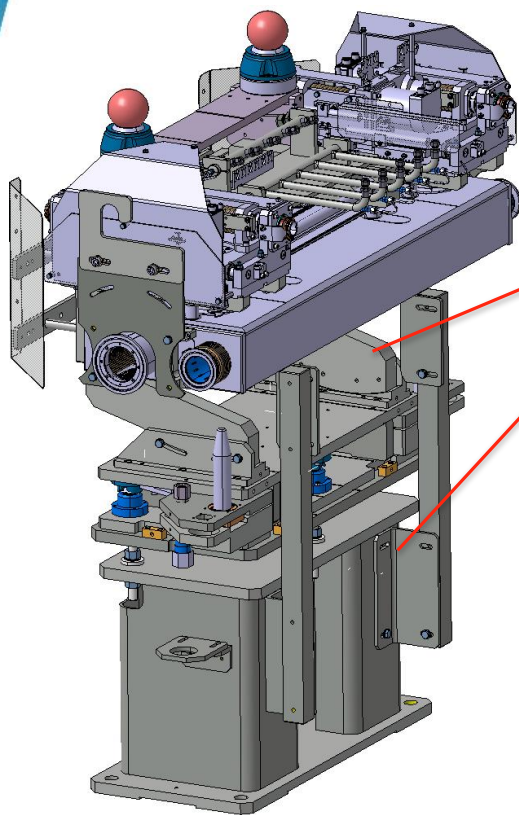
# TCTPH – NEW DESIGN

VACUUM VESSEL	JAW	MECHANICAL TABLE	TANK SUPPORT	APERTURE
<b>NEW type C:</b> Double beam	Standard TCTP	Standard Ph II	Standard TCS	Coll. beam $\varnothing 91$ mm 2nd beam $\varnothing 91$ mm



# TCLX – PRELIMINARY DESIGN

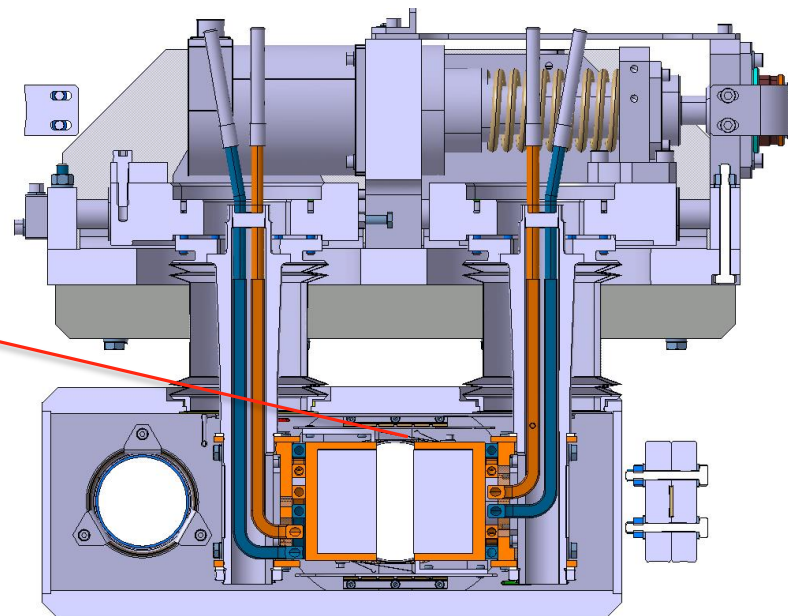
VACUUM VESSEL	JAW	MECHANICAL TABLE	TANK SUPPORT	APERTURE
<b>NEW type C:</b> Double beam	<b>NEW type B</b> Abs. blocks 70x40 mm Back stiffener 10 mm thinner	<b>NEW type B</b> Longer Stroke +30 ; -5	<b>NEW type A</b>	Coll. beam $\varnothing 91$ mm 2nd beam $\varnothing 91$ mm



Tank support

Standard support

Short and long RF fingers



# TCLX PRELIMINARY DESIGN

DN 100 flange - aperture  $\varnothing 91$

171  
 $\pm 5$

Bellow

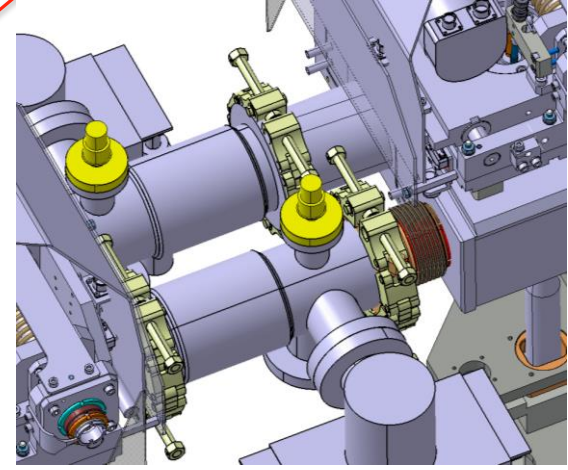
Chamber support

New BPM

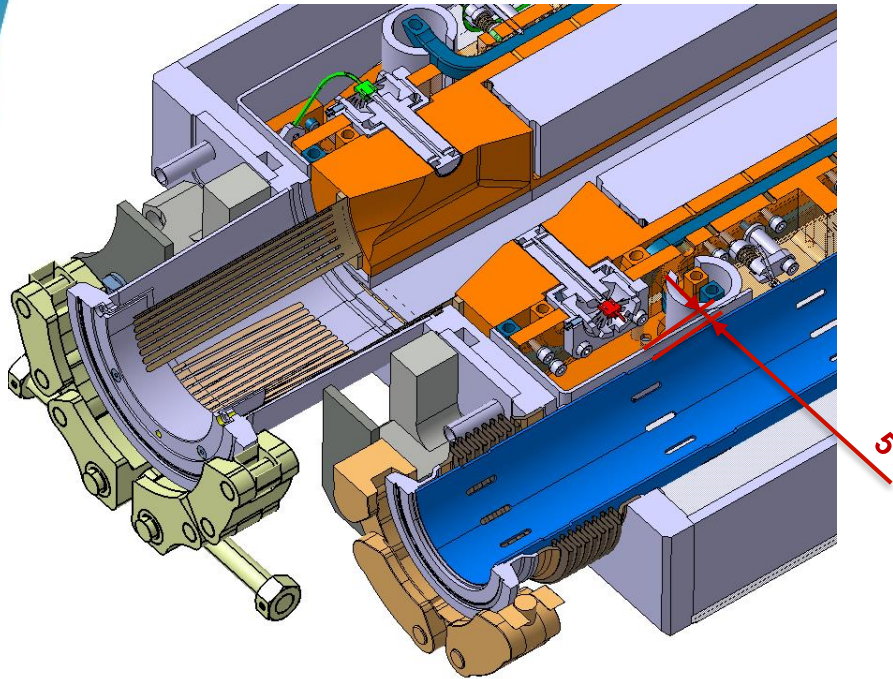
RF contact

DN 63/100 flange - aperture  $\varnothing 60$

- To have a common tank design with TCTPH the second chamber must be moved of  $\pm 5$  mm.
- **A DN100 flange can be used** also on the 2<sup>nd</sup> beam chamber, but extremely tight space for installation
- No automatic MKT connection



# TCLX PRELIMINARY DESIGN



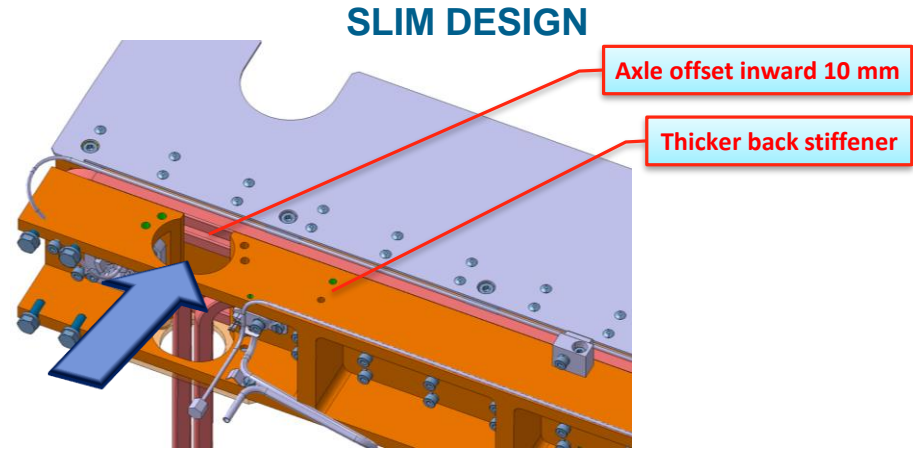
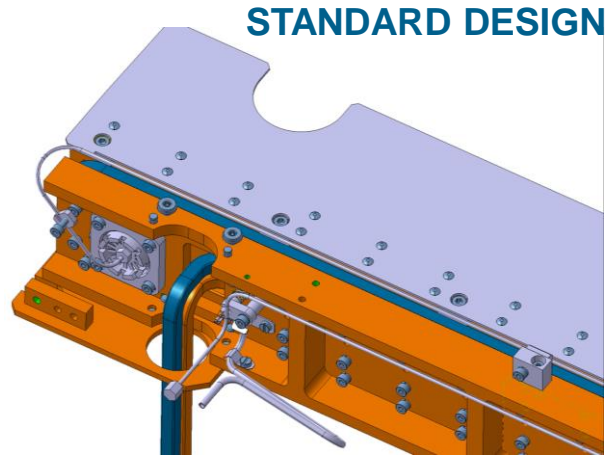
In current design the aperture of the 2<sup>nd</sup> beam chamber cannot be larger than **ø80 mm** because there is not enough space between the jaw and the 2<sup>nd</sup> beam chamber →

**New slim jaw design necessary!**



# TCLX PRELIMINARY DESIGN

Slim jaw design: Thickness optimization of jaw assembly allows saving **10 mm per side**, keeping same jaw functionality.



## THIS DESIGN MUST BE VALIDATED

- Back stiffener modified and W blocks bigger → Validation necessary
  - **FLUKA energy deposition maps**
  - **Mechanical simulation**

# SUMMARY

	VACUUM VESSEL	JAW	MECHANICAL TABLE	TANK SUPPORT	APERTURE
TCTPV	<b>NEW Type A:</b> 20 mm larger Larger Bellows	Standard TCTP	<b>NEW Type A</b> Stroke +40 ; -5	Standard TCS	Coll. beam $\varnothing 91$ mm
	<b>NEW Type B</b> Larger bellows	<b>NEW Type A</b> Back stiffener 10 mm thinner	<b>NEW Type A</b> Stroke +40 ; -5	Standard TCS	Coll. beam $\varnothing 91$ mm
TCTPH	<b>NEW type C:</b> Double beam	Standard TCTP	Standard Ph II	Standard TCS	Coll. beam $\varnothing 91$ mm 2nd beam $\varnothing 91$ mm
TCLX	<b>NEW type C</b> Double beam	<b>NEW type B</b> Abs. blocks 70x40 mm Back stiffener 10 mm thinner	<b>NEW type B</b> Stretched Stroke +30 ; -5	<b>NEW type A</b>	Coll. beam $\varnothing 91$ mm 2nd beam $\varnothing 91$ mm

← Suggested

All others combinations presented during CoLUSM #93 (22-09-2017) abandoned in order to respect the **vacuum requirement to have an aperture of at least  $\varnothing 91$  mm.**

**Thank you for your attention**

