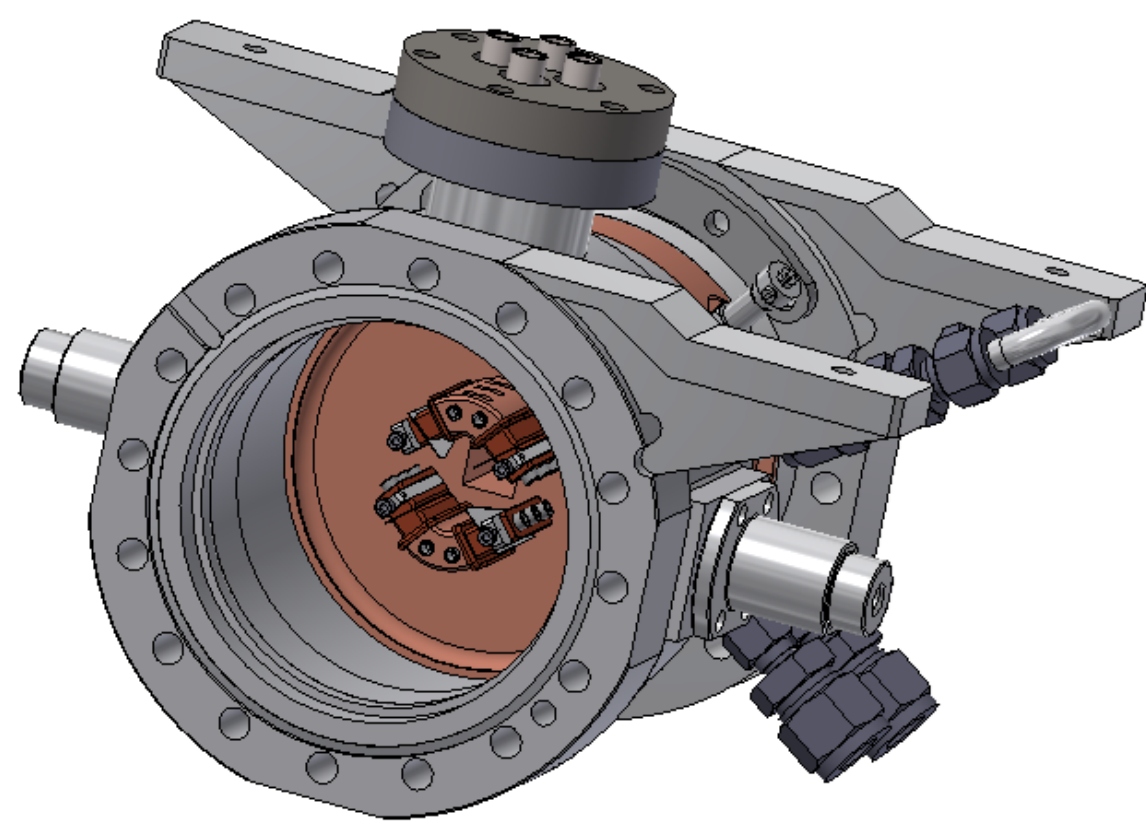
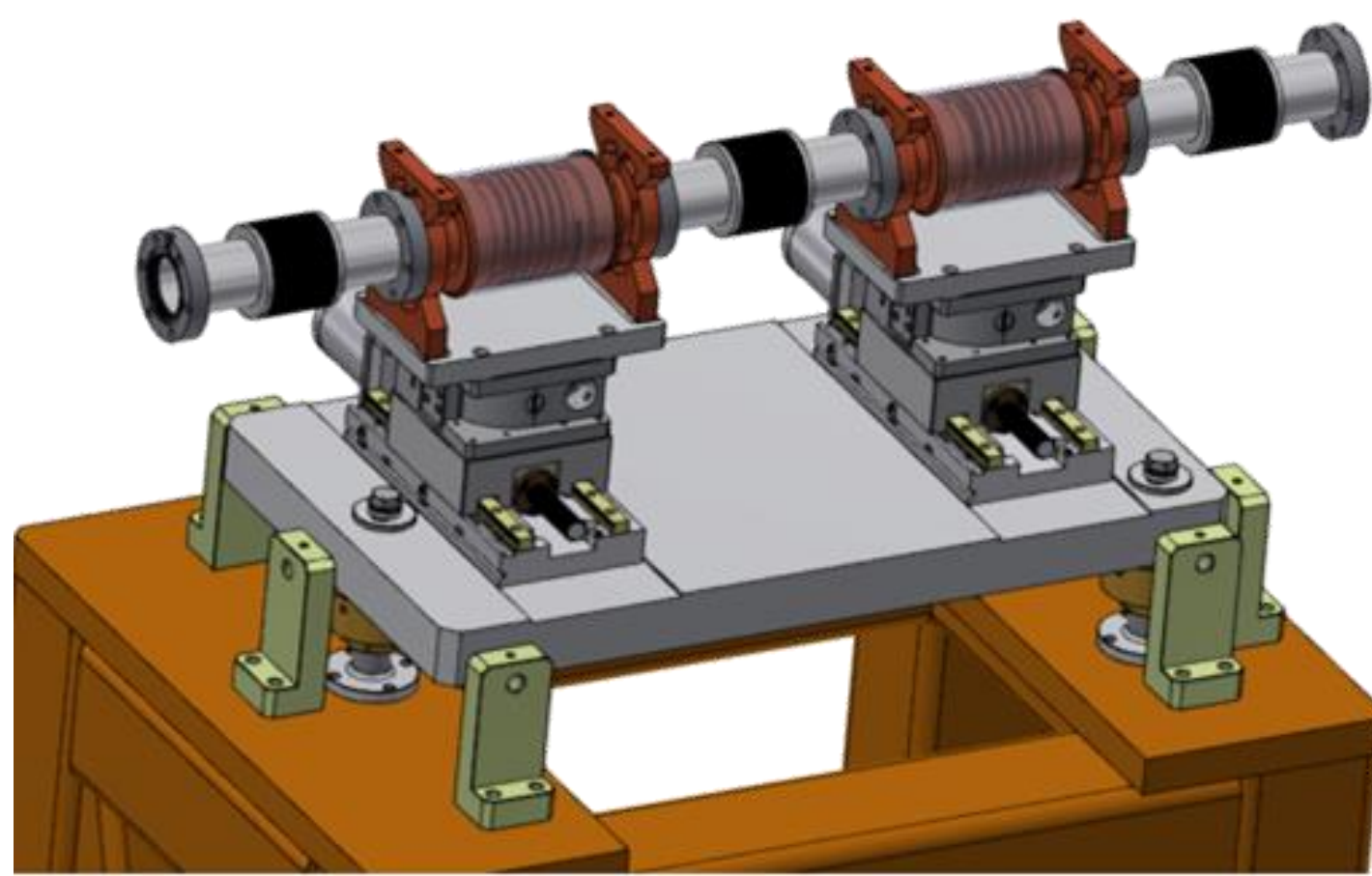




XBPM

The X-Ray Beam Position Monitors detect the photon-beam position with micrometric resolution. Two XBPMs are foreseen in order to provide both position and steering angle information. They will be based on W-blades, that compare the electric current observed in each one of them, by photoelectric effect, in order to derivate the beam position. This device is an improvement of the XBPM used at Soleil. It was developed in a collaboration between LNLS and Soleil. A more detailed description of this topic can be found in the conference article.

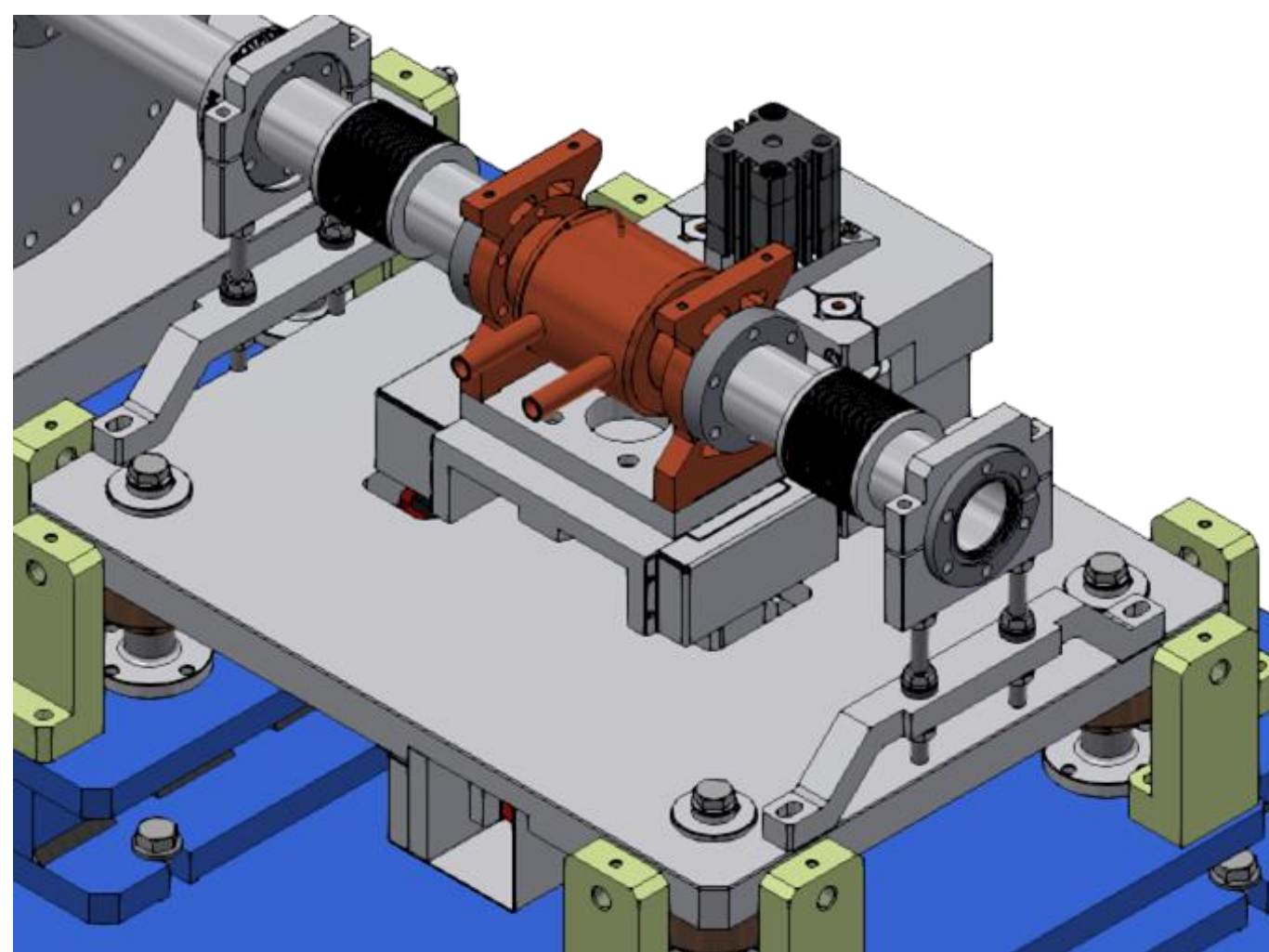


High Power Slits

The High Power Slits are located downstream the Fixed Mask and upstream the Photon Shutter. Each slit has the internal aperture being composed of four surfaces with 4° grazing incidence angle, resulting in a maximum power density of 8.8 W/mm².

Each one has two tungsten blades on the exit side to define the final format of the beam, being intercepted only by a very small portion of it. These blades can be aligned perpendicular, one to the other, and define a square photon beam. The use of these blades is also favorable to minimize the beam scattering.

Photon Shutter

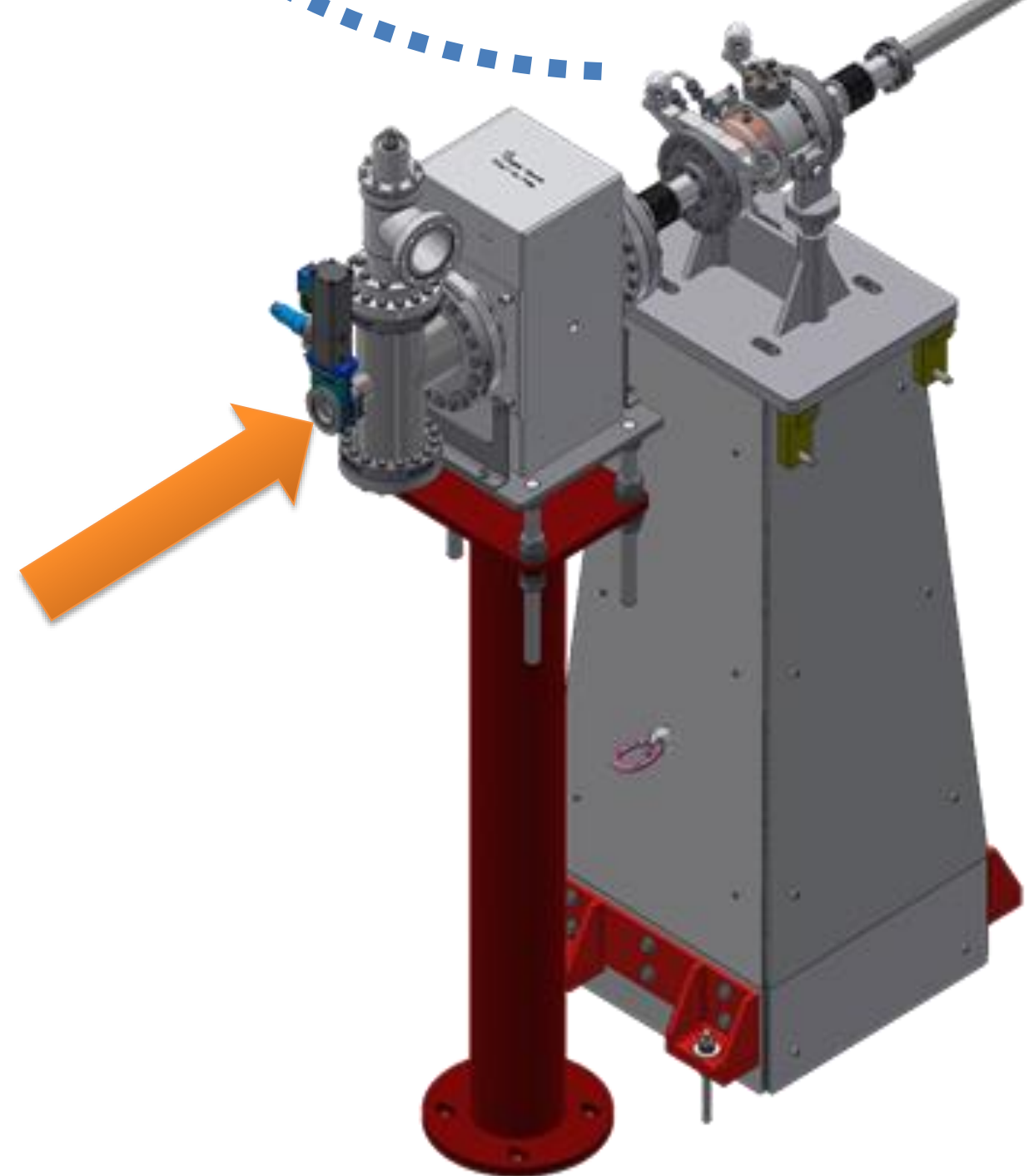


The Photon Shutter has a grazing incidence surface with 9° angle that will intercept the photon-beam when closed, resulting in a maximum power density of 17.4 W/mm². Considering a flow rate of 2.7 L/min, the water velocity is 3 m/s and the calculated water temperature variation is 4.8°C for 900 W of total beam power. The pressure drop calculated by CFD simulation is 0.75 bar.

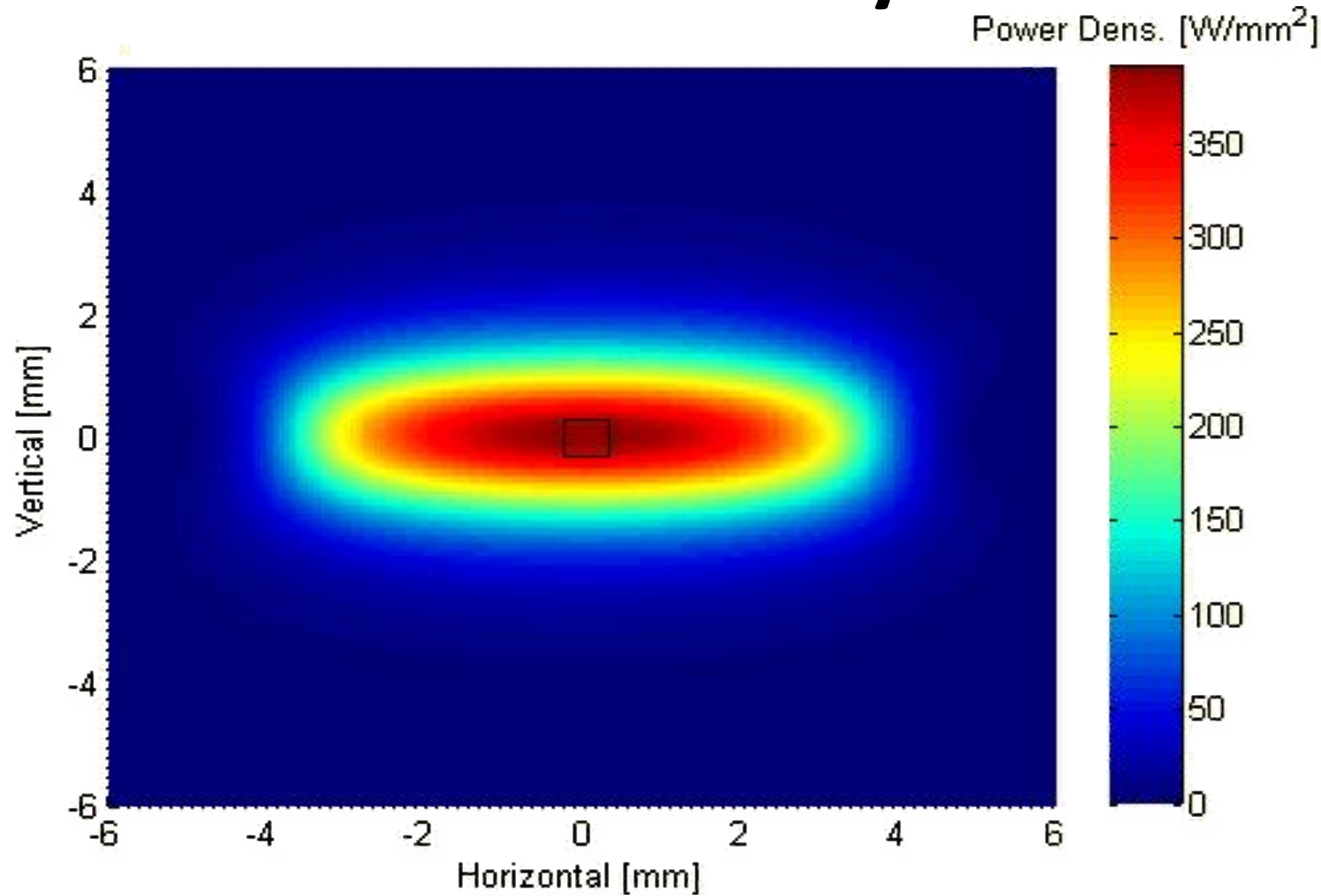
It moves 15mm down by a pneumatic actuator to shut the beam off. A thermocouple is placed inside the Photon Shutter to acquire its temperature for the interlock system.

E-Beam Deflector

Preliminary studies were performed, and it was proposed to utilize a 280 mm length E-Beam Deflector generating a 0.6T magnetic field, positioned at approximately 6.65m from the shielding wall, what will make the electron hit a point localized at 50mm below the tube.



Beam Power Density Profile



Power distribution of the IVU19 ID at 10 m from the source. Only the beam contained inside the black square box is transmitted to the beamline optics.

Timeline

Jan/2015: Concept ready

Jan/2016: Preliminary Design ready

Nov/2016: First prototype Assembled

Nov/2017: Installation of the first 5 Front-ends

IVU19 Front End Aperture Table

Component	Distance from ID source [mm]	Beam Size HxV		Aperture Size		Incident Power [kW]	Absorbed Power [kW]
		[mm]	[mm]	[mm]	[mm]		
XBPM1	15626	2.00x1.00	31.2x15.6	1.01x0.94	15.8x14.6	9.25	0.18
EBD	17000	1.01x0.94	17.2x16.0	ø2.35	ø40	-	-
XBPM2	19143	1.01x0.94	19.3x18.0	1.10x1.02	21x19.6	-	-
FV	19429	1.01x0.94	19.6x18.3	ø2.06	ø40	-	-
FM	20417	1.01x0.94	20.6x19.2	ø0.152	ø3.1	9.07	8.11
HPS-1*	21190	ø0.152	ø3.22	0.38x0.38	8x8	0.96	0.96 max
HPS-2*	21516	ø0.152	ø3.27	0.37x0.37	8x8	0.96	0.96 max
PS	22136	ø0.152	ø3.36	0.68x0.68	15x15	0.96	0/0.96
GS	22803	ø0.152	ø3.47	ø0.44	ø10	-	-

Acknowledgement

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