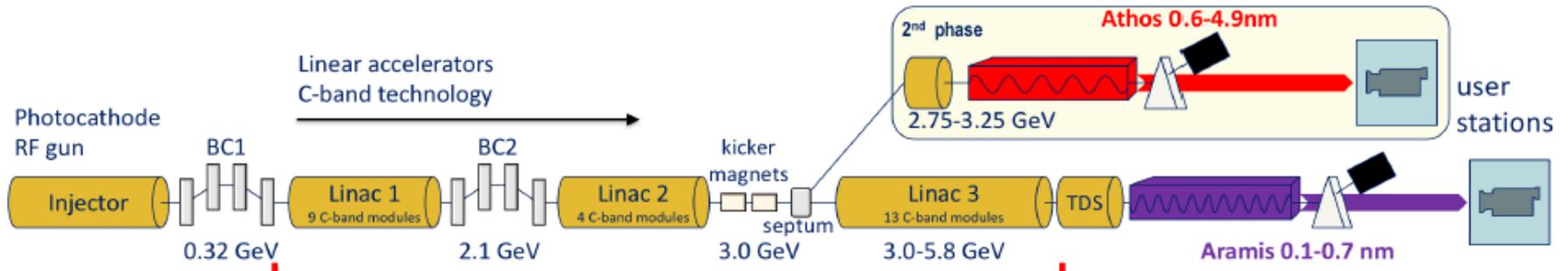


SUMMARY REPORT OF THE VISIT TO SWISSFEL ON 16TH MARCH

Module WG Meeting – 21st March 2018 - C. Rossi and contributions from C. Zennaro's talk at LCWS2017

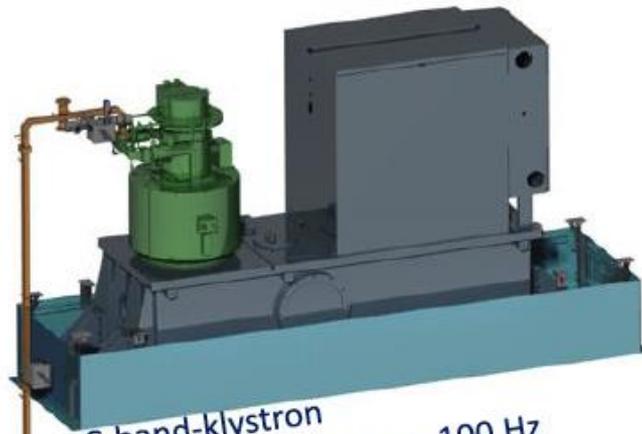


SwissFEL Machine and RF Parameters



	Unit	S-band photogun	S-band cavities (injector)	X-band cavities (injector)	C-band cavities (Linacs 1)	C-band cavities (Linacs 2)	C-band cavities (Linacs 3)	C-band cavities (Athos linac)
Frequency (MHz) – $f_b=142.8$ MHz		2998.8 (21 x f_b)	2998.8 (21 x f_b)	11995.2 (84 x f_b)	5712 (40 X f_b)			
Phase Advance		π	$2\pi/3$	$5\pi/6$	$2\pi/3$			
Active Length	mm	162	4070	750	1978			
Total Length	mm		4150	965	2050			
Number of Cells		2.5	122	72	113			
Operating Temperature	°C	40	40	31	40			
Maximum Gradient	MV/m	120	25	34	28	28	30	30
Operating Gradient	MV/m	100	14.8	25	27	27.5	28.5	28.5
Required Input Peak Power per structure		19 MW for 100 MV/m	24 MW for 16 MV/m	7 MW for 20 MV/m	27.2 MW for 27.5 MV/m			
Klystron maximum performance		35 MW – 4.5 μ s	45 MW – 4.5 μ s	50 MW – 1.5 μ s	50 MW – 2.5 μ s 40 MW – 3 μ s			
Filling Time	ns	490	1000	105	322			
Number of structures		1	6	2	36	16	52	8
Number of structures per klystron		1	1 or 2	2	4			

SwissFEL – RF System

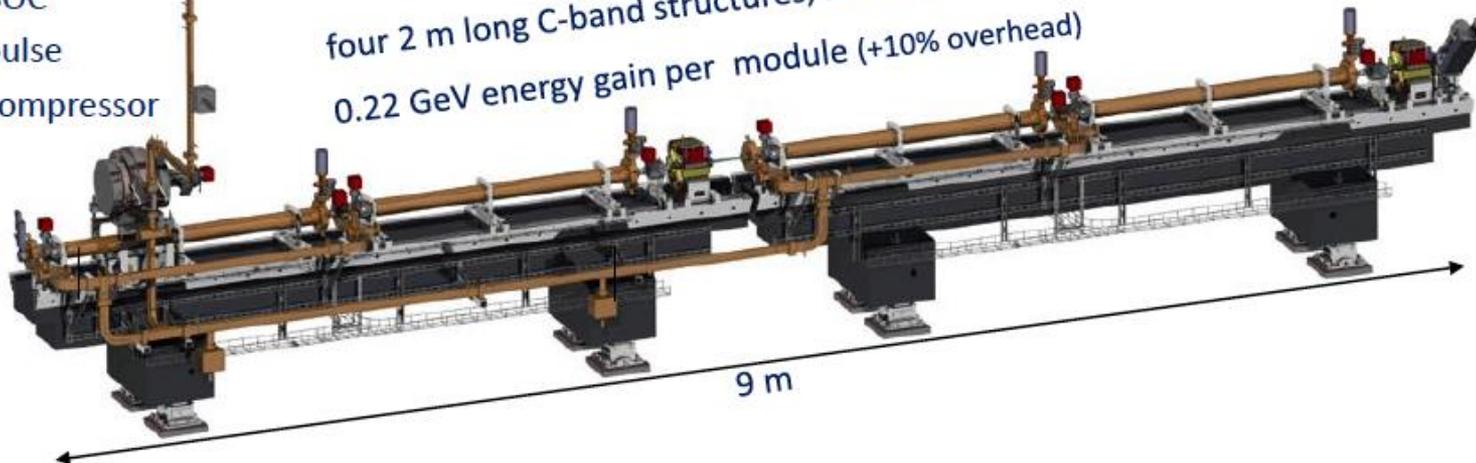


C-band-klystron
5.7 GHz, 50 MW, 3 μ s, 100 Hz

Main LINAC	#
LINAC module	26
Modulator	26
Klystron	26
Pulse compressor	26
Accelerating structure	104
Waveguide splitter	78
Waveguide load	104

BOC
pulse
compressor

four 2 m long C-band structures, 28 MV/m
0.22 GeV energy gain per module (+10% overhead)



9 m

SwissFEL - Modulators

Two prototypes were tested at PSI for evaluation of the series.

50 MW / $3\mu\text{s}$ RF, 370kV / 344A / <20 ppm voltage stability pulse to pulse @ 100 Hz

AMPECON

Type- μ modulator prot. for PSI C-band



- 13 modulators (Linac 1, Linac 2)
- Status 26/10/2017: 12 modulators installed, 9 in operation

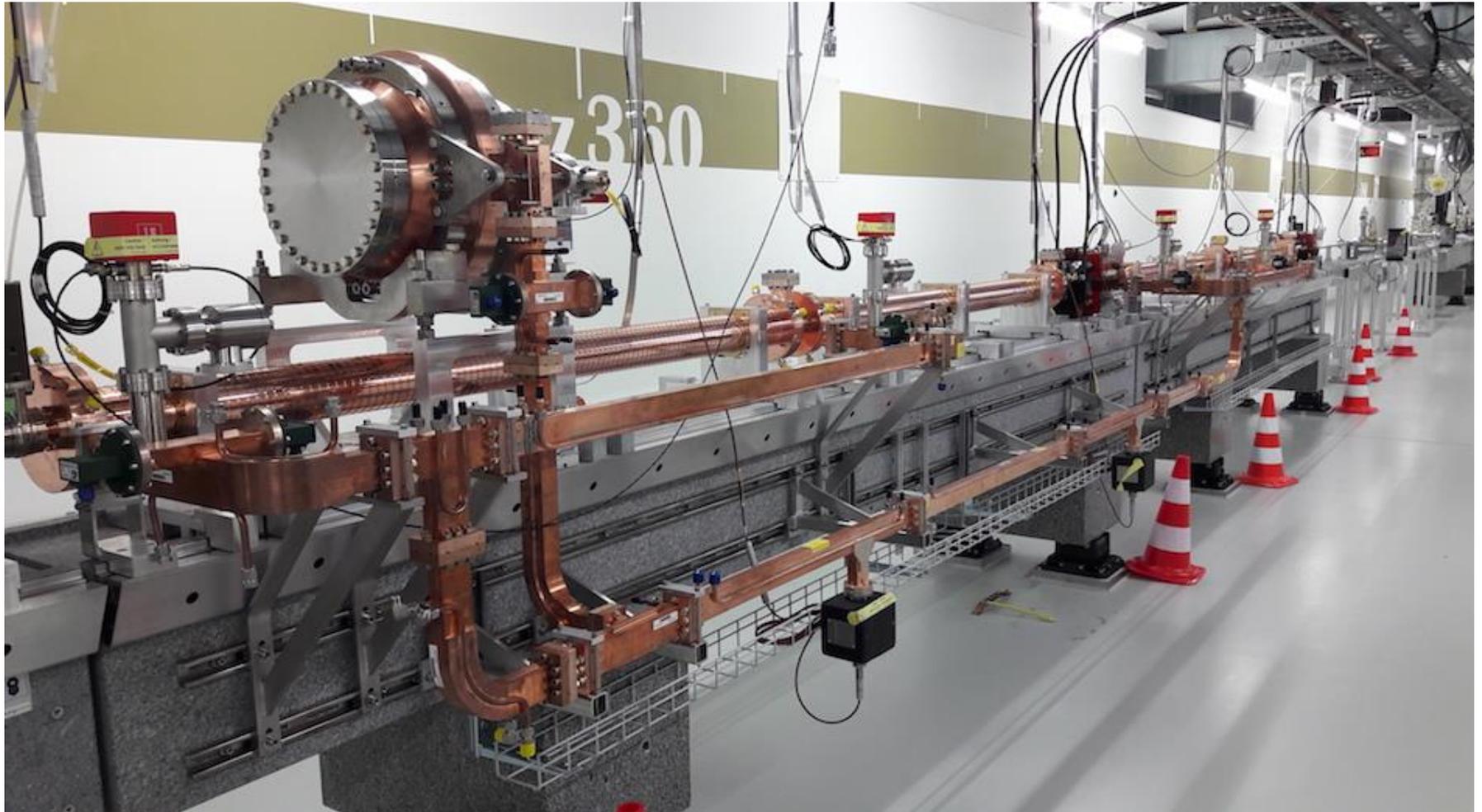
ScandiNova

K2-3 proto. for PSI C-band



- 13 modulators (Linac 3)
- Status 26/10/2017: 5 modulators installed, 2 in operation

SwissFEL - Module



SwissFEL – Module Support (girder)



Epument girder design



AS Support and alignment



Klystron from TOSHIBA
E37212





SwissFEL – Temperature Stabilization



Independent circuit for each module

