Pulse Compressor Options

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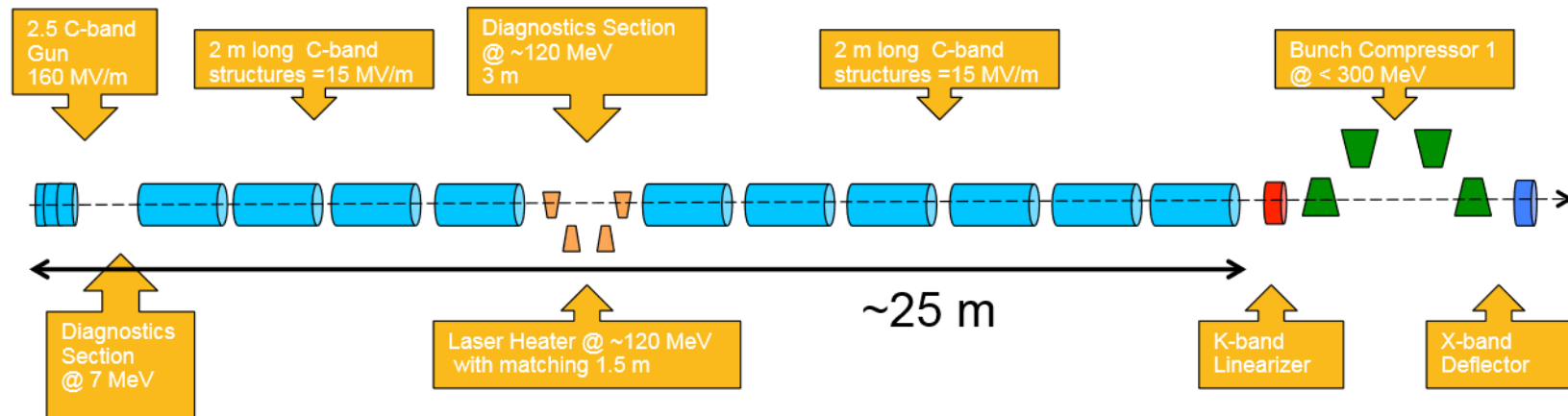# C-band injector diversifies the linearizer choice

*Courtesy by Massimo

Injector works at C-band (~6 GHz)

12 GHz, 18 GHz,24 GHz, 36 GHz, 48 GHz linearizer systems are to be considered

Check the power source and power gain from pulse compressor at different frequencies

Funded by the
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## Full C–band XLS Injector
Compact

- One injector for all the operational modes (HRR and LRR)
  - 2.5 C-band gun with 160 MV/m cathode peak field => longer drift for diagnostics
  - Copper cathode and TiSa Laser
  - Same gradients 15 MV/m in the 2 m long C-band structures, max gain 30 MeV/structure
  - Same diagnostics positions (@ gun exit 7 MeV and in the drift parallel to the LH @ 120 MeV)
  - Same beam parameters at the linac exit
  - Matching with LH to be determined

2.5 C-band Gun 160 MV/m

2 m long C-band structures =15 MV/m

Diagnostics Section @ ~120 MeV 3 m

2 m long C-band structures =15 MV/m

Bunch Compressor 1 @ < 300 MeV

Diagnostics Section @ 7 MeV

Laser Heater @ ~120 MeV with matching 1.5 m

~25 m

K-band Linearizer

X-band Deflector

SLEDII pulse compressor power gain at different frequencies

Compression ratio= $T_{kly}/T_{compressed}$
Similar gain curve at different frequencies
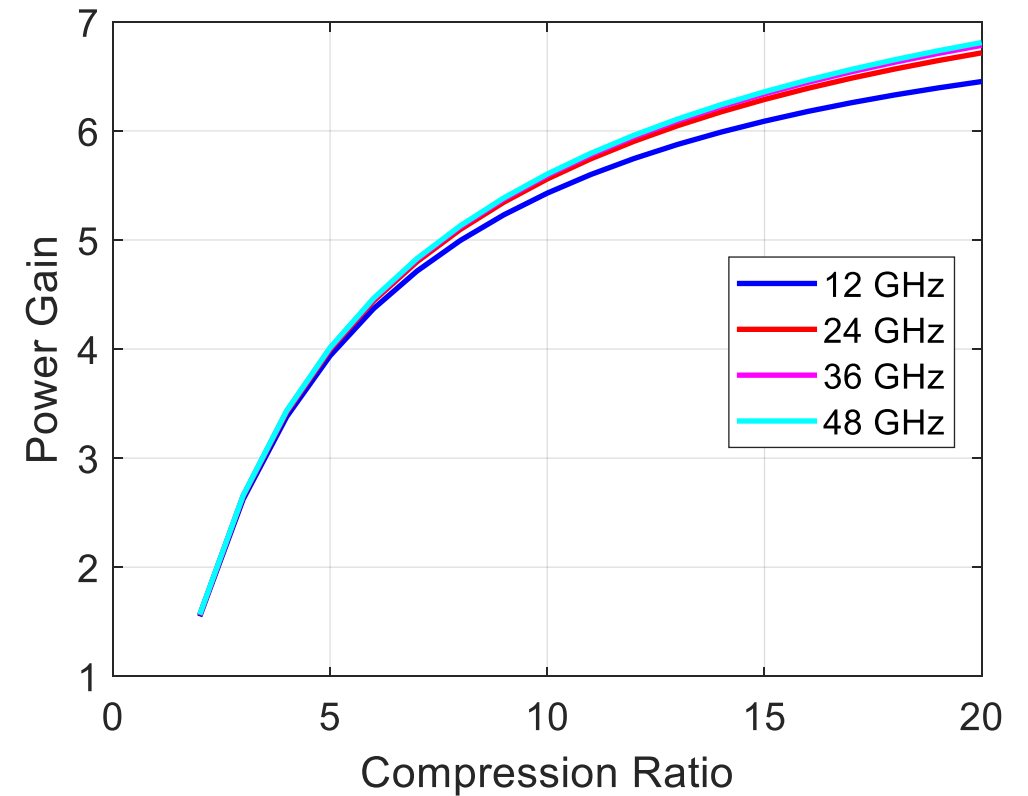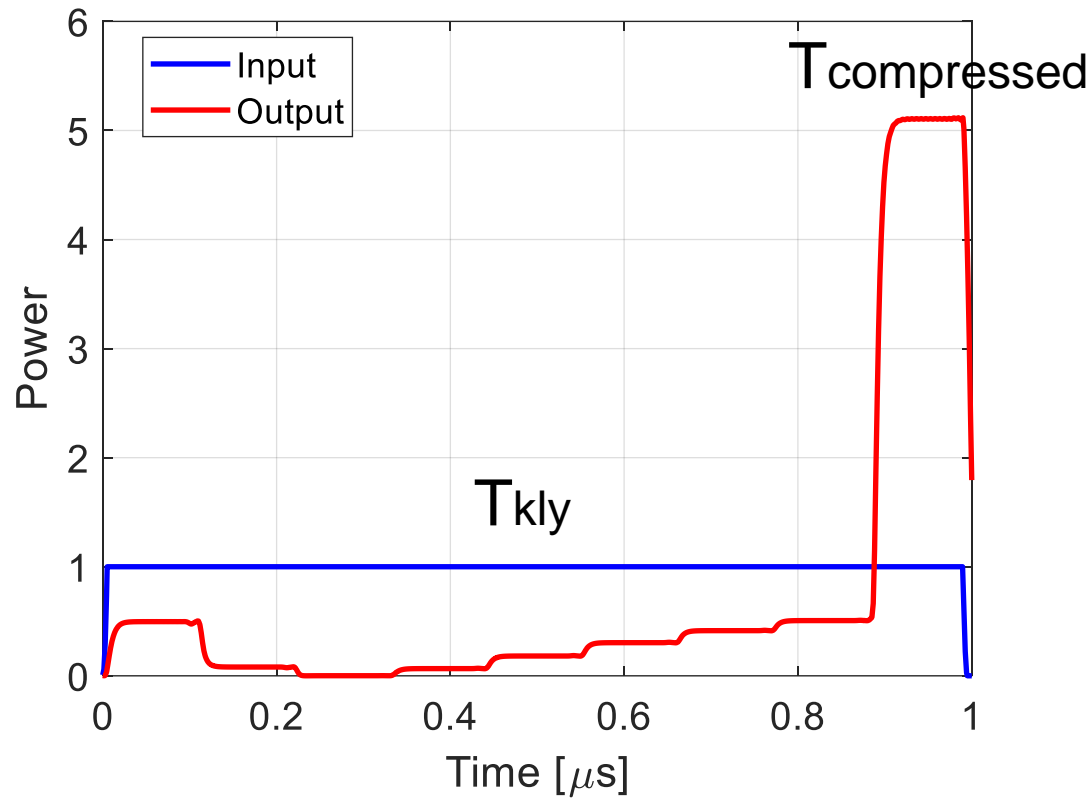
Summary of power capability for the lineariser

Calculate the capability of the power fed into the linearizer at different frequencies

At lower frequencies (12 and 18 GHz), SLEDI pulse compressor should be considered

Frequency [GHz]	Vg [c]	Filling time [ns]	Source output [MW]	SLEDII power gain Klystron pulse width= 700 ns	SLEDII power gain Klystron pulse width= 1500 ns
12	0.01	333.6	25, 50	1.85	3.54
18	0.01	200.1, 100.1	12	2.68, 4.39	4.67, 5.89
24	0.025	53.4, 26.7	6.7	5.68, 6.62	6.76, 7.41
36	0.12	16.7, 8.3, 5.6	3	7.05, 7.47, 7.56	7.68, 7.94, 7.97
48	0.3	3.3, 2.2, 1.1	2	7.69, 7.62, 7.38	8.07, 7.96, 7.68