



WP3 – Gun and Injector

injector layout update

WP3 Deliverables

- **D3.1** - Preliminary assessments and evaluations of the optimum e-gun and injector solution for the CompactLight design, (**=>M18**).
- **D3.2** – A review report on the bunch compression techniques and phase space linearization, (**=>M18**).
- **D3.3** – Design of the injector diagnostics/~~beam manipulations based on a X-band cavities~~, Laser Heater (**=>M39**).
- **D3.4** - Design of the CompactLight e-gun and injector, with phase space linearizer (**=>M39**).
- **WP3 CDR Contribution**

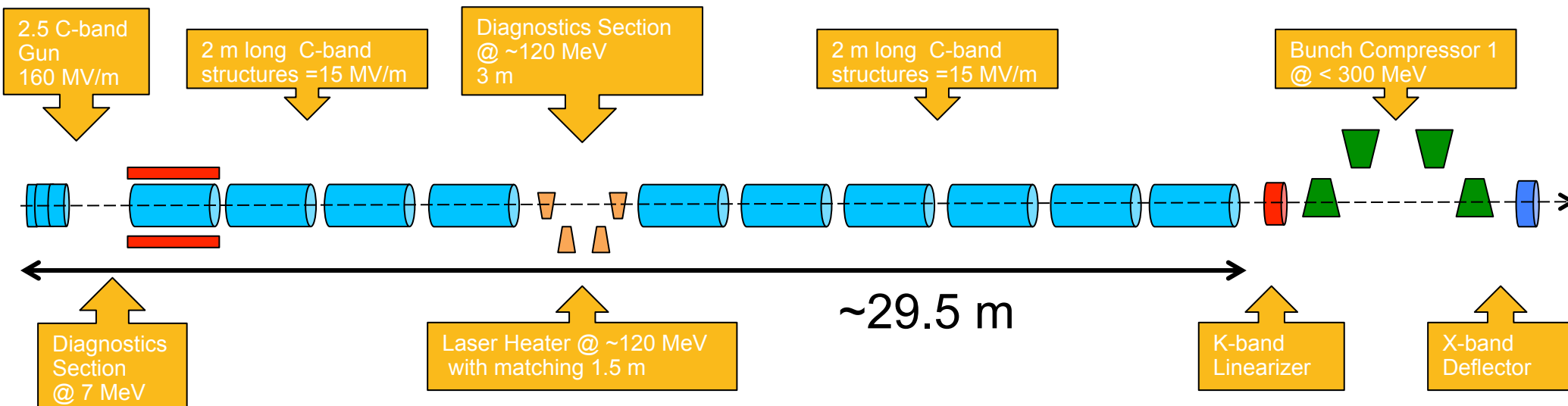
Tasks and sub-Tasks

(task leaders institutes in **bold**)

- **Task 3.1 - Gun Design (RF, Solenoid, Cathode, Laser, Diagnostics) => ~~D3.1 M18~~ => D3.4 M39**
 - a) S-Band Gun RF Design (**CNRS** + IASA+UAIAT-INFN+ALBA)
 - b) C-Band Gun RF Design (INFN +IASA+Sapienza)**
 - c) X-Band Gun RF Design (**CSIC-IFIC** + UAIAT+ Sapienza)
 - d) DC Gun Design (**TU/e**)
 - e) Laser/Photocathode (IASA+CNRS+INFN)**
- **Task 3.2 - Compressor Design (Velocity Bunching, Magnetic Chicane)) => ~~D3.2 M18~~ => D3.4 M39**
 - a) ~~S-Band Velocity Bunching (TU/e + IASA+ALBA)~~
 - b) ~~C-Band Velocity Bunching (INFN +IASA+TU/e)~~
 - c) ~~X-Band Velocity Bunching (Sapienza+CERN+IASA+INFN)~~
 - d) Magnetic Compressor & Laser Heater (ST + CERN+INFN+CNRS) → WP6**
- **Task 3.3 – X-Band Transverse RF Deflector and Injector Diagnostics (Sapienza+ IASA+ UTov) => D3.3 M39**
- **Task 3.4 - : RF Linearizer Design => ~~D3.2 M18~~ => D3.4 M39**
 - a) ~~X-Band RF Linearizer Design (Sapienza)~~
 - b) K-Band RF Linearizer Design (ULANC +Sapienza)**
 - c) ~~Passive linearizer (CNRS)~~



- 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, 0.4 m spacing, 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
 - Solenoid around first C-band accelerating structure, allows also possible VB operation



- Optimal BC1 input energy (=> and position)
 - Without Velocity Bunching
 - With Laser Heater
 - K-band Linearizer just before the BC1, X-band RFD downstream BC1



- Laser/Cathode system survival at 1 kHz
- Include fringing fields in the gun region
- C-band Power source OK
- Verify LH energy, ~~not excluding possible VB~~
- X-band module @ 30 MV/m after LH => 7.5 m less
- **Fix the configuration of the k-band linearizer @1 kHz**
- Injector CAD model very welcome



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Thank you!

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