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Test beams @ LNF

BTF nominal parameters

Parameter	Values			
Maximum average flux	3.125 10^{10} particles/s			
Spot size	1–25 mm (y) 1–55 mm (x)			
Divergence	1–2 mrad			
	Parasitic mode		Dedicated mode	
Pulse duration	10 ns		1.5–40 ns Selectable	
Repetition rate	Variable between 10 Hz and 49 Hz Depending on DAFNE mode		1–49 Hz Selectable	
	With target	Without target	With target	Without target
Particle species	e^+ or e^- Selectable by user	e^+ or e^- Depending on DAFNE mode	e^+ or e^- Selectable	
Energy	25–500 MeV	510 MeV	25–700 MeV (e^-) 25–500 MeV (e^+)	250–730 MeV (e^-) 250–530 MeV (e^+)
Energy spread	1% at 500 MeV	0.5%	0.5%	
Intensity (particles/bunch)	1–10^5	10^7–1.5 10^{10}	1–10^5	10^3–3 10^{10}

BTF current status

- beam size: few mm, usually larger in high-intensity mode
- high intensity mode:
  - 10 ns bunches,
  - 10^6 - 10^9 electrons/bunch
  - 24 Hz bunch rate (dedicated mode) - few Hz (parasitic mode)
- remotely controlled movable table with area 35x35 cm^2 max. load 60 kg available to support test equipment

Equivalent Dose at BTF

- dose is energy / volume
  - 1 Gray/s max for LUXE BPM (second detector)
  - 10 MGray in 10^7 s
- volume scaling
  - nominal GBP volume at LUXE dV_L: 100um x 100 um x 100 um
  - at BTF dV_B: 1 cm x 1 mm x 100 um $= 10^3 dV_L$
    - beam spot size to be verified
- energy delivery rate scaling
  - nominal at LUXE (second detector) E_L: 25 GeV /s
  - with 10^10 *e-*/s x 60 keV: $E_B = 600000$ GeV/s $= 24000 \times E_L$
- time scaling
  - @BTF 24 x higher dose/s
  - dose corresponding to 1 year nominal running (10 MGray) in 10^7 s/ 24 = 4.8 days

A few questions affecting the mech. design

- can the two PCBs be mounted back-to-back ?
- this will makes it possible to have the cables getting out toward the exterior of the GBP station
- at what time scale are we aiming for the design of the patch panel ?
- how tight should the Faraday cage be ? what kind of gas flow inside should be consider as baseline ?