DARK LIGHT at the TRIUMF e-linac

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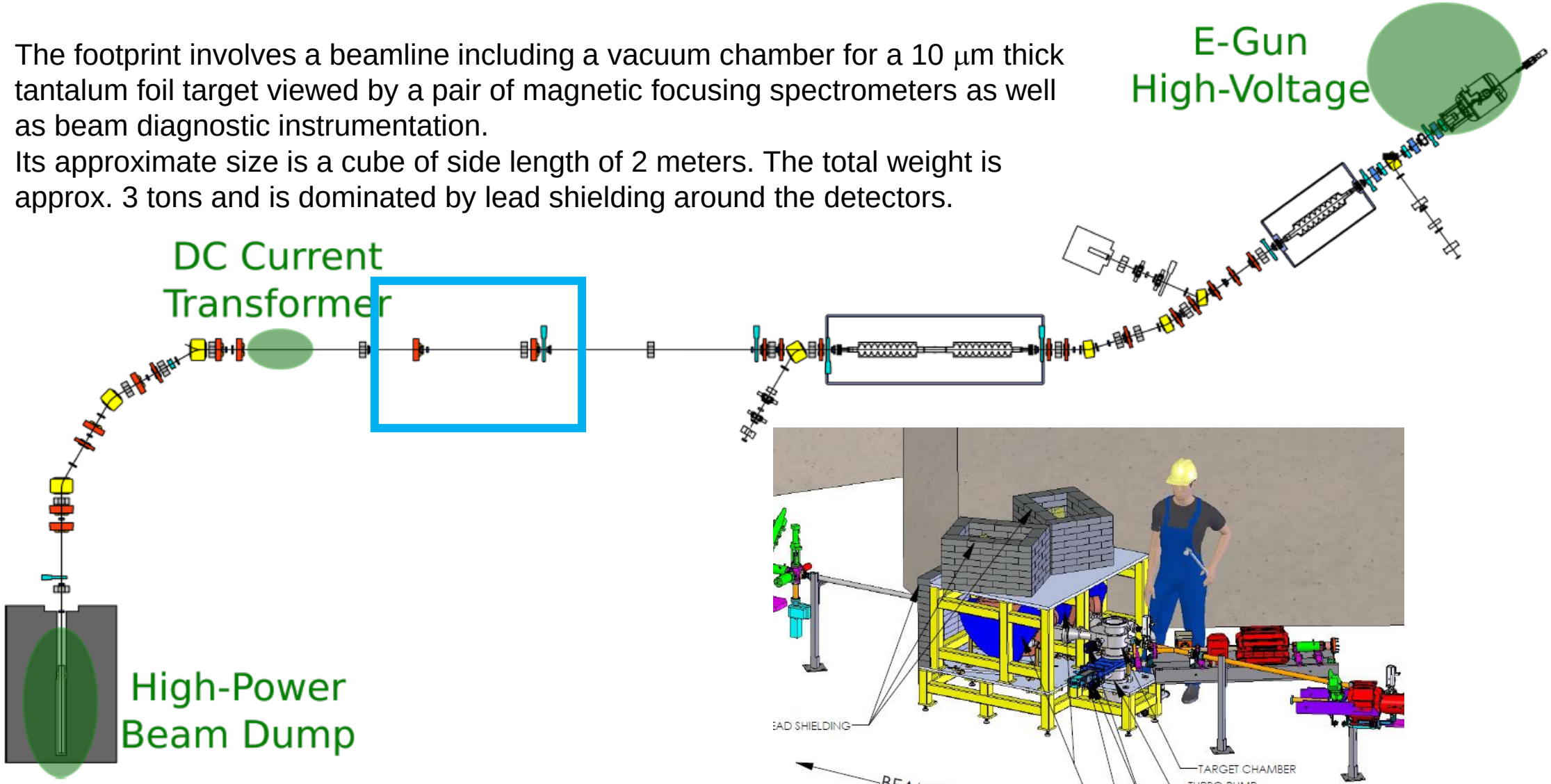
Position of the experiment in stage 0

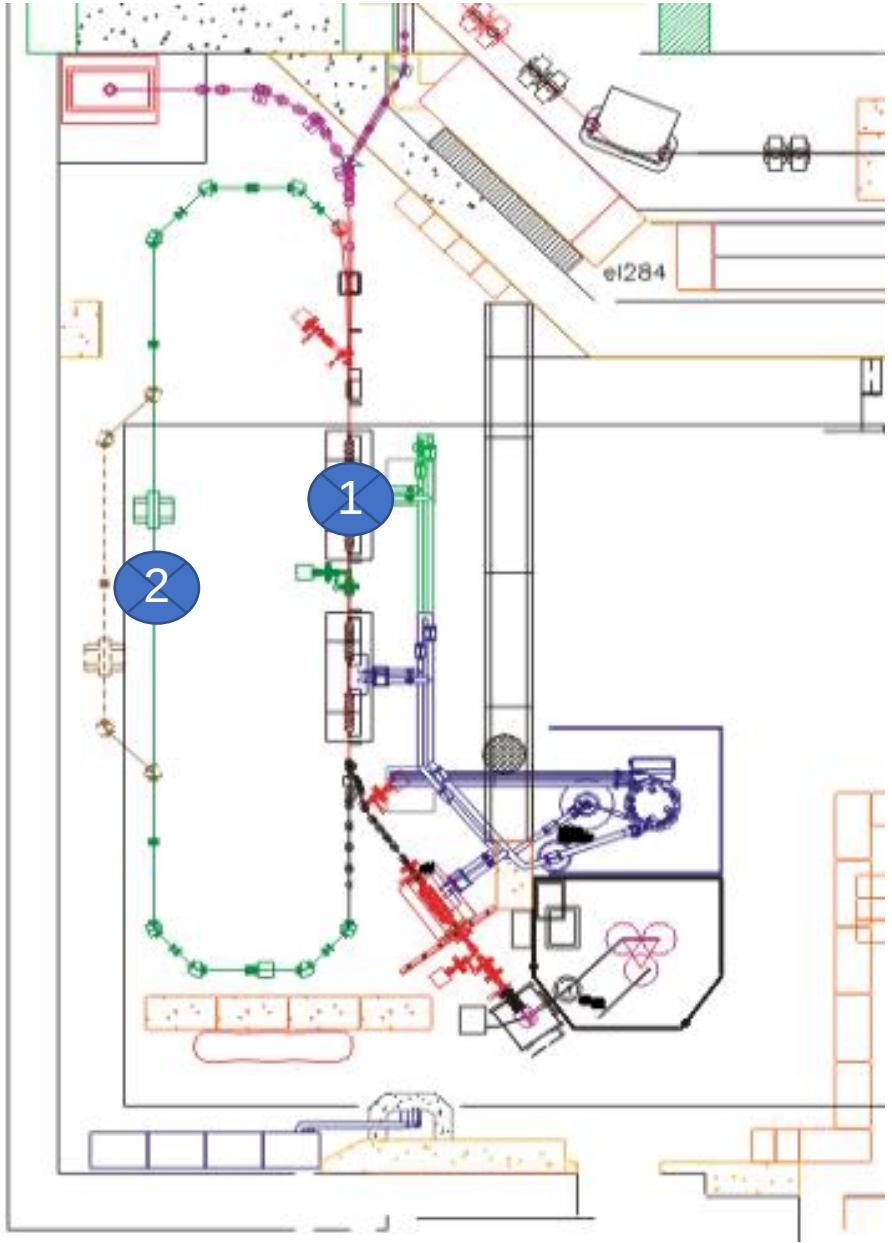
- The footprint involves a beamline including a vacuum chamber for a 10 μm thick tantalum foil target viewed by a pair of magnetic focusing spectrometers as well as beam diagnostic instrumentation.
- Its approximate size is a cube of side length of 2 meters. The total weight is approx. 3 tons and is dominated by lead shielding around the detectors.

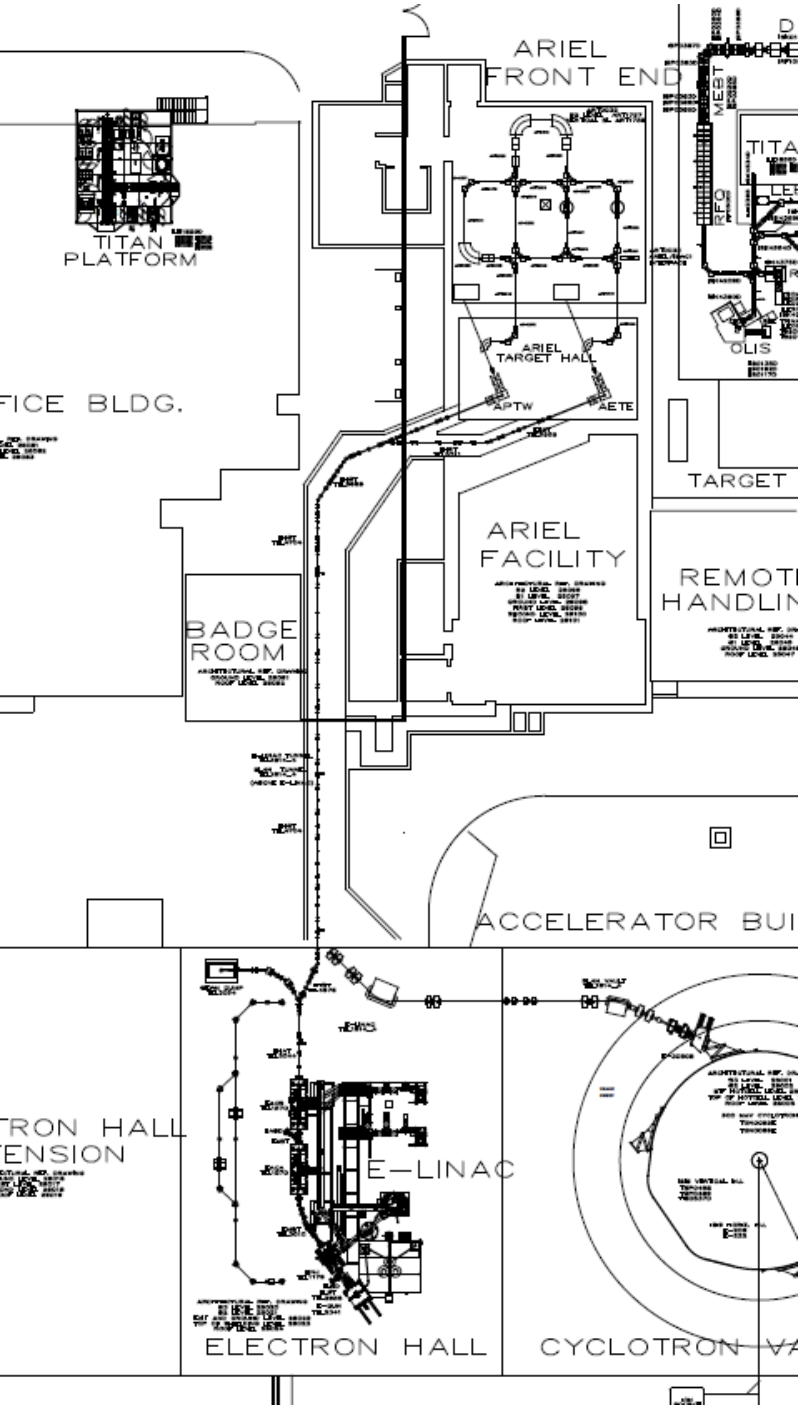


E-linac with re-circulation lines

- Stage 1: add recirculation and move experiment into position 2 (or 1) in fly-through configuration. Need re-capture unit. Energy to ~ 50 MeV

- Stage 2: Add a second cryo-module, keep experiment at position 2. Energy to ~ 55-75 MeV
  - That will allow the higher beam energy without circulation
  - Multi-experiment operation: DarkLight and ARIEL isotope production.





At TRIUMF:

1. pre-proposal review by technical committee and approved for EEC submission.
2. PP EEC review (mid April 2021, chair Natalie Roe Berkeley)

Phase 0 would be at lower energies and up to ~32MeV, this would require very moderate modifications.

Phase 1 could be using the re-circulation option; we have most elements available but some design and manufacturing is still needed. This would allow somewhat higher energy and possibly higher intensity. This could be possible within 2-3 years from now.

Phase 2 could be an additional cryomodule to allow to go to higher energies and flexibility for operation. The cryo-module accelerator element and the recirculation would allow to go to 60MeV and eventually 75MeV. For this we would anticipate a Canadian funding option (CFI) in 2022/3 and if funded this would be possible in 4/5 years from now.