
Low-energy RHIC electron Cooler (LEReC) cost estimate

December 2, 2014



LEReC-I accelerator design

Beam transport and layout, as frozen on November 17.

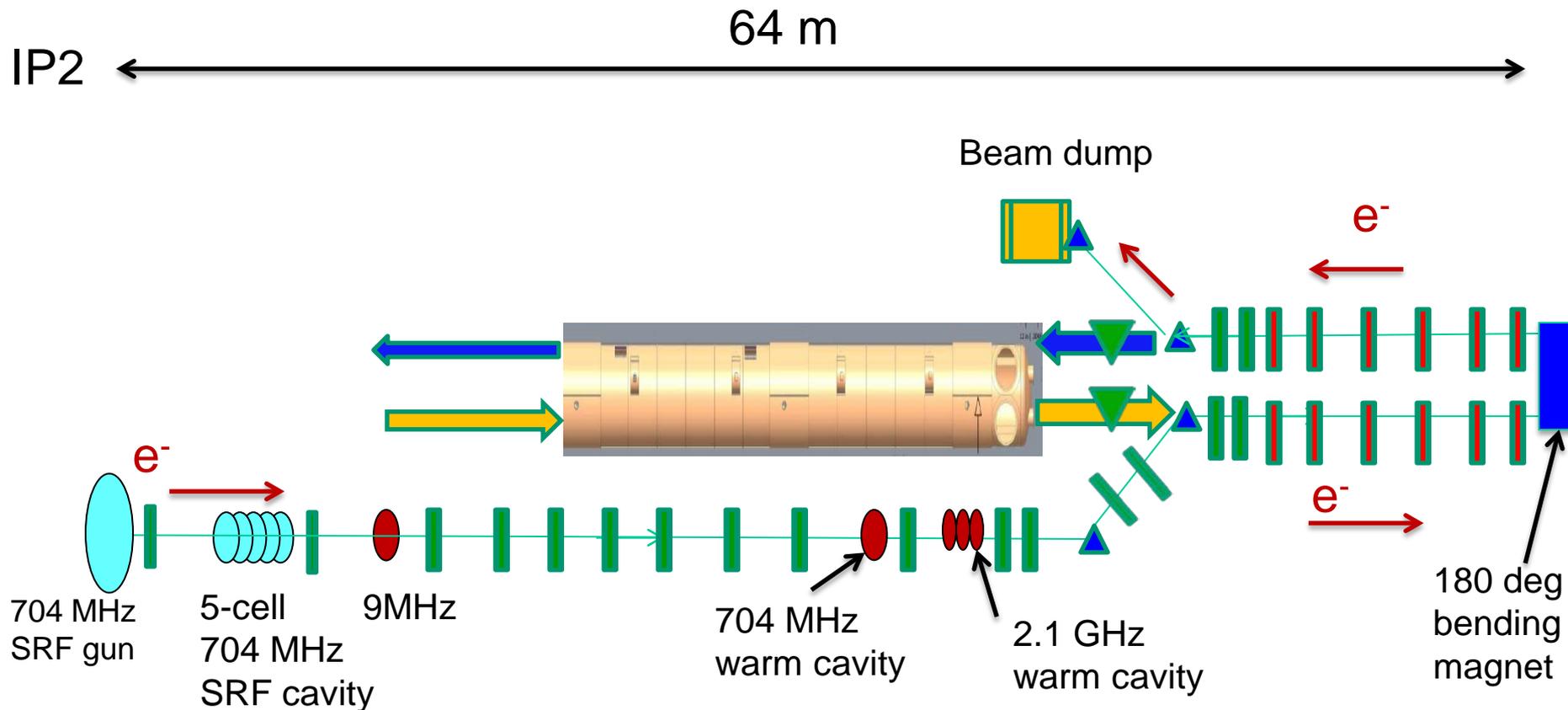
Design is compatible with with both SRF gun and DC gun.
In present design SRF gun is used either as a gun or
for the DC-gun option as SRF-booster:

- 1) Baseline option: SRF gun used as a gun
- 2) Parallel path: DC+SRF gun used as a booster cavity



LEReC-I (1.6-2MeV): Gun to dump SRF gun used as a gun

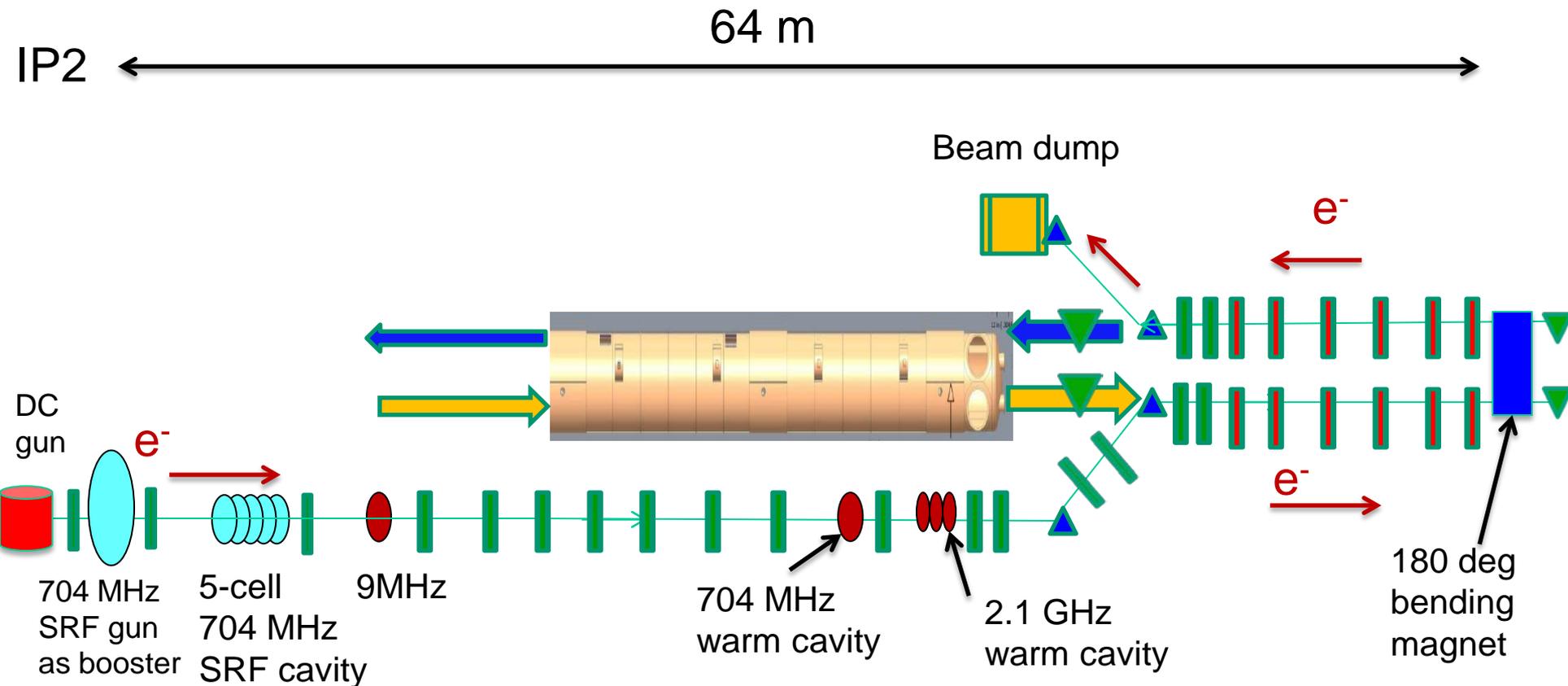
12/02/14



LEReC-I (1.6-2MeV): Gun to dump

SRF gun used as a booster cavity

12/02/14



Present effort: new LEReC-I (12/02/2014 baseline)

- **LEReC-I (1.6-2MeV), 2017:**

Gun (parallel path both with SRF and DC gun):

- 1) SRF gun from ERL
- 2) DC gun (Cornell University)

-no SRF 5-cell cavity modification needed

+704MHz warm cavity for energy spread correction (250kV, PA: 15 kW)

- Reduced voltage for 2.1 GHz warm cavity (100kV, PA: 10kW)

9 MHz RHIC bouncer cavity (2kV), available from RHIC

-No return electron beam transport line with magnets/diagnostics

-Less cooling section solenoids

+More BPMs for cooling section

+Solenoids for electron beam transport line

- Less civil construction: new AIP project on infrastructure



New baseline LEReC-I

- **LEReC-I (1.6-2MeV), 2017:**

Significant cost changes in:

- SRF (SRF gun modifications to work with just 65kW of power)
- Warm RF cavities (reduced voltage 2.1GHz, **new 704MHz**)
- Power amplifiers (**new 65kW for 5-cell SRF gun or cavity solid state 10kW for 2.1 GHz**)
- Magnets (**10 solenoids for transport line**)
- Power supplies (less)
- Diagnostics (less, no return beam line)
- Vacuum (less)
- Beam dump and extraction line (from ERL)
- Civil (**less, new separate AIP started**)
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Cooling section

- 20 deg. Merger dipoles (gap=10cm): 2 magnets
- 180 deg. U-turn dipole (gap=10cm): 1 magnet
- Small aperture merger solenoids (1.5kG): 2
- Large aperture cooling section matching solenoids (1.5 kG): 4
- Large aperture cooling section weak solenoids (200 G): 12
- H and V correctors inside each solenoid
- Large aperture cooling section BPMs: 14
- Profile monitors: 6

