

Loose ends

Ion Source, Injector Configuration, Species

300 mA Ne⁺¹ requires 500 kV across gap

short pulse allows higher field strength which will reduce emittance. 500 kV gives an emittance of 1 pi mm-mrad 1 rms normalized for long pulses

ion species is a non-issue (gas load on column)

Current limit

no large issues at the 20 MeV level Still working on the injection energy

Exit emittance

source emittance is larger than I first assumed.

Rethink the overall emittance budget

emittance per beam is about .4 mmrad pi 1 rms normalized.

The linac output emittance is almost unchanged here.

Number of beams N

Emittance of N combined beams, small enough?

Emittance of recombining beams from a large ring radius of beamlets gives very bad overall transverse emittance unless some magic recombiner can be devised. Must use energy-time correlation of beam

to accomplish. Can N beams converging at large angles on target give the required spot power density? (single and collective effects).

What kind of focusing can be applied to each beamlet near the target?

Superconducting solenoids with multiple channels

high-current pulsed normal temp solenoid?

ANL has been using commercial 9T solenoids on ATLAS

15T solenoids should be feasible

worried about multiple aperture solenoids

Debuncher voltage

essentially the initial energy spread of the beam before debunching, about 300 kV

Final momentum spread after debunching, most of the beam will be within $\pm 0.2\%$ dke/ke

Energy tilt section parameters

N-channel converger parameters, correct E-field?

Must this be a travelling wave structure? (Meander line), as bunch length is less than the length of the device.

3-gap resonators – a little more detail

will have very large drift tubes, 60 cm in diameter. Load to low frequency, giving small cavity diameter and about 60 joules stored energy. Energy supplied to beam each cavity is about 10% of this.

Injection Energy

is 2 MeV necessary? Now down to 50 Mhz.

Species variability

Ability to do continuous energy variability

a real plus

Stored energy/pulse energy in cavities

see above

Slice emittance/Twiss parameters

Ultimate current limit

scraping and vacuum issues

scrapers must be placed in throats of vacuum pumps

frequency selection – is 50 Mhz near optimum?

These are very large radius drift tubes

Writeups – Writing Assignments

Ultimate charge number/density

Different approaches, including those rejected

Alvarez-linac

Pulsed drift-tube structure

Peter's structure

Concepts

introducing tilt in separated-cavity linac

SC solenoids over AG focusing

multiple beamlets: transporting, combining

Areas of future development

Existing test bed sites

Tilt Pulse

50 Mhz + delta, followed by debuncher

debuncher followed by 3 Mhz cavity

debuncher followed by induction core

single-beam linac followed by stacker ring

Areas of future development

engineering design of multiple-beamlet devices

ion sources, drift tubes, focusing devices

beam dynamics simulations

beam combining techniques

assess state of readiness

existing test beds