Front end simulations: Introduction

R.C. Fernow
BNL
Muon Collaboration Meeting
LBNL

15 February 2005

Outline

- this morning's program
- next MC Friday meeting
- Miami workshop
- Study 2b simulations paper

This morning's program

- front end simulations

(1) neutrino factory

J. Gallardo – Study 2a front end

D. Neuffer – buncher/rotator developments

(2) muon collider

D. Summers – anti-cyclotron cooling ring

A. Klier – cooling ring studies using Geant

K. Yonehara – helical cooling channel

(3) tabletop cooling rings

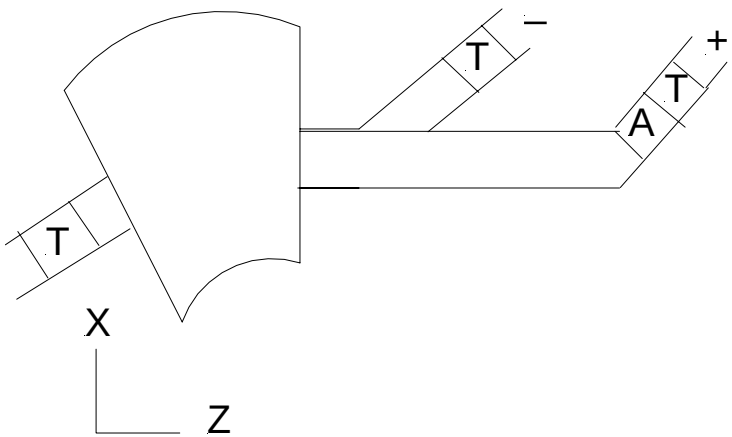
H. Kirk – gas-filled cooling rings

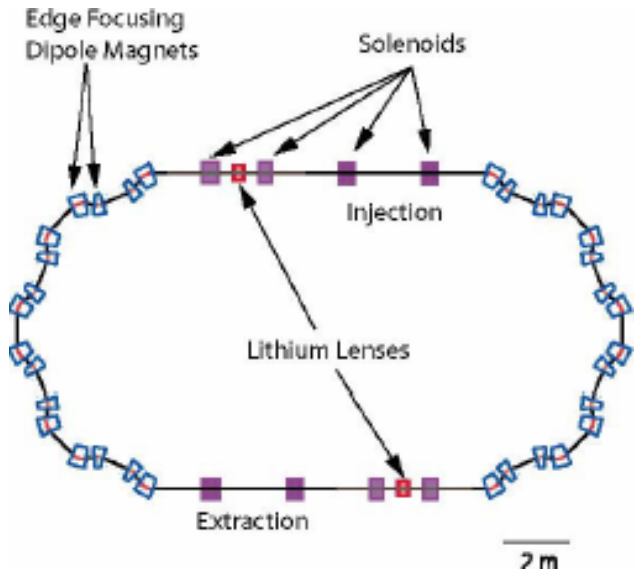
Next MC Friday meeting

- Friday February 25
- on front end simulations

(1) R. Fernow – charge separation

(2) Y. Fukui – Li lens ring





Miami Workshop

- 4 ½ day workshop on muon collider simulations
- arrangements made by MSU
- talks on the web: http://bt.pa.msu.edu/MU/Miami2004

Suffering for science

Presentations

- survey of critical R&D issues (Palmer)
- front-end system design (Johnson, Neuffer[Balbekov], Galea)
- simulation tools (Roberts)
- phase rotation & bunching (Neuffer, Poklonksiy, Fernow, Paul)
- cooling channels (Yonehara, Derbenev, Bogacz)
- cooling rings (Summers, Fukui, Kirk, Kahn, Klier)
- acceleration (Berg)
- collider ring (Trbojevic, Johnstone, Berz, Wan)
- theory (Cline, Godang)

(my) Goals

- rekindle momentum on muon collider systems simulations √
- reexamine critical issues that need to be addressed √ √
- focus ring cooler studies towards specific parts of collider system √
- make plans for detailed end-to-end simulation of a muon collider X
  - same level of detail as NF study 2a
  - self-consistent → good/bad beam correlations
  - try to reach Status Report requirements for front end
  - 0.16 μ/p with $\varepsilon_{6N} = 0.17$ mm^3

Assessment

- good
  - there is still a lot of interest in muon colliders
  - some level of effort on many critical machine issues
  - workshop encouraged some new collaborations
  - Muons Inc is putting lots of effort on one front-end approach
- not so good
  - still many possible alternatives need to be investigated
  - limited person-power to do needed simulations

→ lots of encouraging progress, but
no light at the end of this tunnel yet!

Neutrino factory Study 2b paper

- we've done lots of simulation work
  on Study 2a,b NF machine design
- new front-end and accelerator designs
- many detailed beam simulations
- working on new paper
- PRSTAB
- J. Gallardo is editor