

Simulations – 5 year plan

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Front end –neutrino factory

- investigate refinements of Study 2b
 - study shortening the phase rotator
 - study slightly tapering the cooler parameters
 - study thermal properties of absorber windows
- try to incorporate any promising new developments
 - e.g. gas-filled channel
 - there is a synergy with collider ideas
- try to incorporate aspects of the European or Japanese designs
 - e.g. study NF designs with no cooling
- simulations in support of Feasibility Study 3 (if funded)
 - include engineering feedback to design
 - realistic magnet designs
 - error studies
 - cost/performance optimization

Front end – muon collider

- study collider **system** design based on using ring coolers
 - study realistic injection/extraction systems for rings
 - design required 6D pre-cooler
 - study thermal issues for ring absorbers
- optimize RFOFO ring cooler performance
- study ultimate performance of realistic rings
 - study lithium lens cooling (if needed)
- investigate alternatives to single bunch collection at target
- compare the ring cooler system with the gas-filled approach
- do complete, self-consistent collider front-end design

Front end – tabletop cooling ring demo

- continue studies of small rings
 - gas-filled dipole ring
 - anti-cyclotron ring
- complete realistic field modeling
- optimize ring and beam parameters
- study injection (extraction?)
- study beam instrumentation
- design realistic magnets and cavities
- produce complete design for a 6D cooling demonstration

Accelerator – linac design

- finish matching from cooling
- determine final linac energy
- optimize aperture in conjunction with cooling
- study transmission with realistic magnet ends
- produce realistic solenoid designs
- full 6D tracking

Accelerator - RLA

- produce full design, including transfer lines
- track through full system
- understand most important design issues
- optimize the design
- produce realistic magnet designs
- understand how to determine energy cutoffs between stages (general problem)

Accelerators - FFAGs

- describe relation between acceptance & FFAG design parameters
- understand parameters for longitudinal dynamics in non-ideal case
 - asymmetric “parabola”
 - higher harmonic rf
- reiterate designs based on understanding of above
- produce realistic magnet designs
- full 6D tracking
- injection/extraction problems
- continue studying FFAG electron model

Other topics

- these are not simulation topics
- but they are closely related
- we shouldn't lose sight of them
- too early to give cost or schedule

(1) construct FFAG electron model

(2) construct tabletop ring cooler demo