Concluding Remarks

NFMCC Collaboration Meeting

UCLA

February 1, 2007
On Going Activities

MERIT
MICE
Mucool
ISS
Solid Target Studies
6-D Cooling

The State of the Collaboration is Excellent!

Harold G. Kirk
The MERIT Experiment

MERcury Intense Target Beam on Target July 2007

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The MICE Experiment

Beam Characterization August 2007

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Mucool

The MTA is the focus of Mucool activities:

- RF testing (805 and 201 MHz)
- High pressure $H_2$ gas-filled RF
- $LH_2$ Absorber tests
- High Intensity Beam
  - Will start with low intensity
International Scoping Study

The ISS Baseline

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Solid Target Studies

BNL-Materials Irradiation at BLIP

RAL-Longevity Studies with High Energy Depositions

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6D Cooling Studies

Muon collider and Neutrino factory eXperiment (MANX) (white: reference orbit, blue: particles)

- Liquid Lithium
- Total Current
- Arc length
- RF Gap
- Vacuum length
- Gradient
- Freq.
- Phase
- $\mu \cdot P_Z$

Fukui-Bent Li Lens

Muons, Inc
Manx, PIC, and
REMEX

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New Ideas and Initiatives

Low Energy Neutrino Factory -- S. Geer
A Three Pass Cooling Channel -- G. Rees
EMMA -- R. Edgecock
IDS – Ken Long
High Field Solenoids – R. Palmer, Muons Inc
MERIT ' - Pb-Bi Eutectic
Totally Active Scintillator Detector

Muon Charge separation down to 400 MeV/c
Major Issue: Insert magnet field in 15m x 15m x 100m volume

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Schematic of Dog-bone Re-circulator

Muon Cooling Channel

K1 off/on

K2 on/off

$\mu^\pm$

Solenoids, $S$

$\mu^\pm$

Solenoids, $S$
Bend sequence:

Kicker $-9^\circ$
BN $-42^\circ$
BP $+51^\circ$
BR $-45^\circ$
BD $+45^\circ$
BD $+45^\circ$
BD $+45^\circ$

Mirror symmetry for return bends
The EMMA Cell
EMMA “Dipole”s + Quads

Pipe apertures: -21.6 to 20.7
Vertical: 17.8
Shifts: 4.9 to 10.2

Pipe apertures: -6.1 to 18.8
Vertical: 23.4
Shifts: 28.7 to 48.6

Goal: Study beam dynamics in a non-scaling FFAG machine

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The International Design Study

Engineered design by 2012 (RDR).

The International Design Study (IDS) will build on the successful conclusion of the International Scoping Study (ISS) in which an international study team developed a unified set of parameters for a future Neutrino Factory.

The year 2012 is significant in that Europe’s LHC debt will be retired by that year.
Enable final cooling for a Muon Collider

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Pb-Bi Eutectic (LBE)

Advantages:

Solid at room temperature
High-Z
High boiling point (1670°C - less cavitation?)
Less toxic than Hg

Disadvantages:

125°C operating temperature
Polonium production

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Future Plans for NFMCC

- MERIT experiment: Beam in July 2007
- MICE experiment: First Beam Fall 2007
- EMMA project: 2007-2010
- Participate in International Design Study: 2007-2010
  - FFAG studies
  - Storage ring designs
- Collaborate with FNAL MCTF and Muons, Inc: 2007-2010
  - Develop 6D cooling lattices
  - 50T Solenoid R&D
  - 1-2 TeV Acceleration
  - Collider designs