High-intensity muon source: Accomplishments & Status

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MAP Collaboration Meeting

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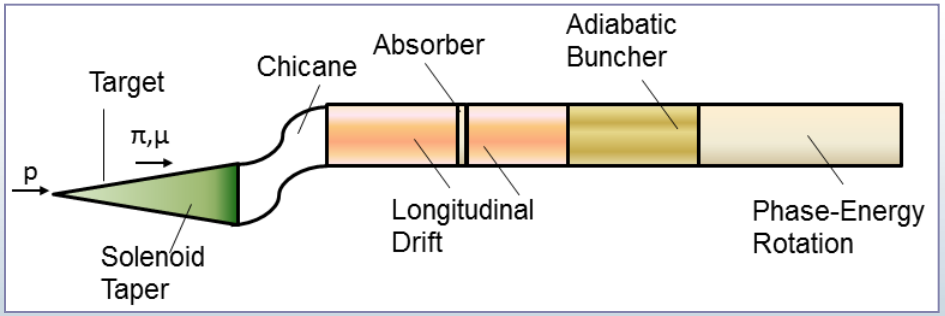
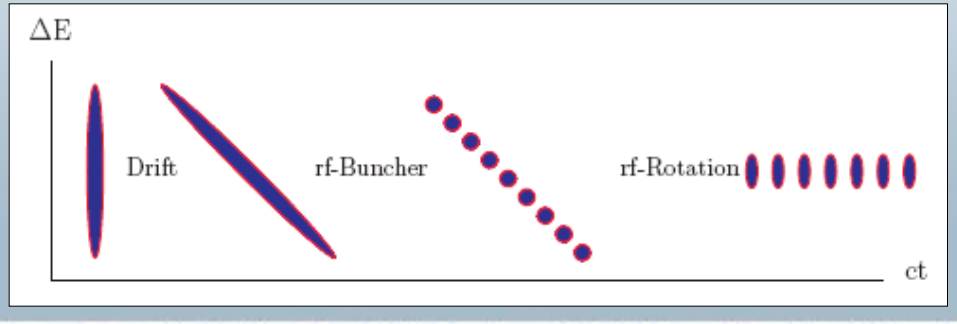
Outline

- Brief introduction of a intense muon source
- Overview of accomplishments
- Session agenda
- Next steps
- Summary

High-intensity muon source

- Goals of a high-intensity muon source
  - Capture muons that result from the decay of pions that are produced by a high intensity proton beam impacting a target
  - Perform initial phase space manipulation of these muons to make them well-suited to subsequent accelerator systems and/or experiments
- Major components:
  - Target & capture
  - Chicane
  - Decay channel
  - Buncher
  - Phase-Rotator



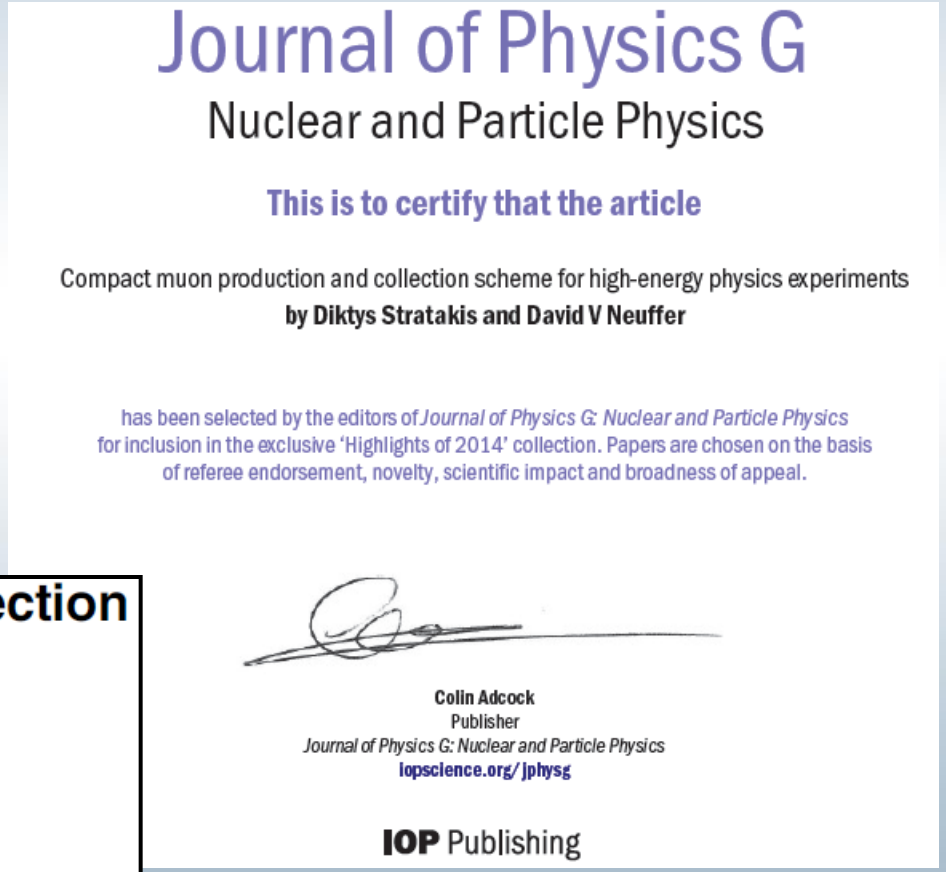


Accomplishments since last MAP meeting

- FE group presented 4 posters at IPAC 2015
- Produced new distributions with MARS for a Carbon and Mercury target (Ding, Berg)
- Re-optimized front-end for the Carbon target (Neuffer)
- Designed a new channel with gas filled cavities (Neuffer, Stratakis)
- Initiated energy deposition slides (Snopok)

Muon paper: Editor's highlights!

- Our review paper published in Journal of Physics G received special attention!



Journal of Physics G

Nuclear and Particle Physics

This is to certify that the article

Compact muon production and collection scheme for high-energy physics experiments

by Diktys Stratakis and David V Neuffer

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Compact muon production and collection scheme for high-energy physics experiments

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Monitoring activities

- We maintain a web page with all simulation decks, papers, reports etc…
- Biweekly phone meetings

https://pubweb.bnl.gov/~diktys/FE.html

Today's agenda

10:00 **Particle production of a carbon/mercury system for the intensity frontier** *25'*
Speaker: Dr. Xiaoping Ding (UCLA)
Discussion *5'*

10:25 - 10:55 Coffee Break

10:55 - 12:40 High Intensity Muon Beams
Convener: Dr. Diktys Stratakis (Brookhaven National Laboratory)
Location:

10:55 **Bunch-merger and low-energy production on a spallation target** *35'*
Speaker: Dr. Yu Bao (University of California Riverside)
Discussion *10'*

11:30 **Target: Status and future plans** *25'*
Speaker: Prof. Kirk McDonald (Princeton University)
Discussion *5'*

11:55 **Beam Emittance and Energy Spectra for Hg and C Targets** *20'*
Speaker: Dr. J. Scott Berg (Brookhaven National Laboratory)
Material: Slides
Discussion *5'*

12:15 **Front-end with gas filled cavities** *25'*
Speaker: Dr. David Neuffer (Fermilab)
Discussion *5'*

12:40 - 13:40 Lunch

13:40 - 15:05 High Intensity Muon Beams
Convener: Dr. Diktys Stratakis (Brookhaven National Laboratory), Dr. Diktys Stratakis (Brookhav National Laboratory)

13:40 **Simulation Studies for High-Intensity Muon Source** *25'*
Speaker: Dr. Hisham Sayed (Brookhaven National Laboratory)
Discussion *5'*

14:05 **Energy Deposition Studies** *25'*
Speaker: Dr. Pavel Snopok (IIT/Fermilab)

Current activities

- Re-optimize Hg target for 6.75 GeV (McDonald, Ding)
- Finalize energy deposition (Snopok)
- Store and document all lattice files

Summary

- Under MAP management, significant progress has been made in developing advanced concepts for the capture and transport of a muon beam produced by the interaction of a intense proton beam with a target
- You will hear our major results from our speakers shortly!

Acknowledgement

- A. Alekou, J.S. Berg, X. Ding, H. Kirk, K. McDonald, D. Neuffer, R. B. Palmer, C. T. Rogers, R. Ryne, P.Snopok, H. Sayed, B. Weggel