

# Towards Concluding the Dedicated Volume on Muon Accelerators

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- Non-MICE MAP activities are winding down this FY
- It is critical that we document all that we have learned
- There is a large amount of progress to report in technology R&D, design of subsystems and systems, technology demonstrations,...
  - for example, nearly 50 papers at IPAC'15!



### An issue of JINST devoted to "Muon Accelerators for Particle Physics"

#### **Muon Accelerators for Particle Physics**

#### Abstract:

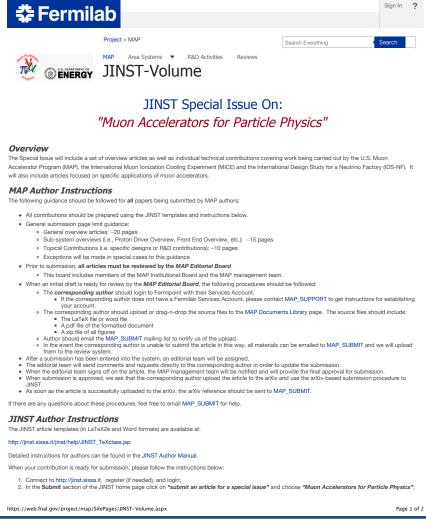
Muon accelerators offer unique potential for particle physics applications. The decay of muon beams within a storage ring can provide pure, well-characterized and intense neutrino beams for short- and long-baseline neutrino-oscillation studies – thus providing measurements of key parameters, such as the CP-violating phase, with unmatched precision and uniquely-sensitive probes for new physics. Muon beams are not subject to the synchrotron radiation and beamstrahlung limits imposed on electron-positron colliders because the muon mass is 200 times that of the electron. Thus muon beams can be accelerated to TeV-scale energies and stored in collider rings where the beams can interact for many revolutions. For center-of-mass energies >1 TeV, muon colliders provide the most power efficient route to providing a high luminosity lepton collider.

The concept of the muon collider (MC) was first proposed in 1969¹, while the concept for the neutrino factory (NF) appeared in 1997². The original design concepts have been developed through a series of design studies and a program of accelerator R&D has been carried out to lay the groundwork for deploying these next-generation particle physics capabilities. This volume summarizes work that has been carried out by the U.S. Muon Accelerator Program (MAP)³, the International Design Study for a Neutrino Factory (IDS-NF)⁴, and the international Muon Ionization Cooling Experiment (MICE)⁵ to establish the design concepts and to carry out the required feasibility R&D for these machines. It summarizes the current state of the designs for short- and long-baseline neutrino factories (including the nuSTORM short-baseline NF, the IDS-NF reference design and the NuMAX long-baseline concept) as well as the current collider concepts. It also summarizes the status of the technology R&D that has been carried out to allow these capabilities to be deployed and, in particular, the efforts underway at MICE to demonstrate the feasibility of producing cooled muon beams.

## Instructions for Authors



https://web.fnal.gov/project/map/SitePages/JINST-Volume.aspx







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ub-Section Overview	Muon Cooling	P. Snopok	snopok@gmail.com	MAP Cooling Design Team
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opical Contribution	Helical Cooling Channel Overview	K. Yonehara	yonehara@fnal.gov	HCC Team
opical Contribution	Charge Separation for 6D Cooling	C. Yoshikawa	yosh@fnal.gov	
opical Contribution	Bunch Merge for the Vacuum Cooling Channel	Y. Bao R. Palmer	yu.bao@ucr.edu	II Count
opical Contribution	Final Cooling  Neuffer/Summers Final Cooling (based on IPAC`15 contribution, ArXiv)	K. Paimer	palmer@bnl.gov	H. Sayed
ub-Section Overview	Fast Acceleration Systems	J.S. Berg	jsberg@bnl.gov	A. Bogacz, D. Hartill, et al
opical Contribution	Dual-Use Linac Concept for Muon and H- Acceleration	A. Bogacz	bogacz@jlab.org	A. Bogacz, D. Hartill, et al
opical Contribution	Design and Beam Dyanamics Issues of Dogbone RLAs	A. Bogacz	bogacz@jlab.org	
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ub-Section Overview	Neutrino Factory Storage Ring Concepts for Short- and Long-Baseline	A. Bogacz	bogacz@jlab.org	J. Pasternak, et al
opical Contribution	Short Baseline: Design and Beam Dynamics of the RFFAG	JB. Lagrange	j.lagrange@imperial.ac.uk	
opical Contribution	Short Baseline: Design and Beam Dynamics of the FODO Ring	A. Liu	aoliu@fnal.gov	
opical Contribution	Long Baseline: Decay Ring Design of the Long Baseline Neutrino Factory	J. Pasternak	j.pasternak@imperial.ac.uk	D. Kelliher
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ub-Section Overview	Collider Concepts and the Machine-Detector Interface	Y. Alexahin	alexahin@fnal.gov	Mazzacane
opical Contribution	Lattice Challenges and Solutions: Higgs Factory	Y. Alexahin	alexahin@fnal.gov	
opical Contribution	Lattice Challenges and Solutions: High Energy Colliders	Y. Alexahin	alexahin@fnal.gov	
opical Contribution	MDI: Mitigating Impact on Superconducting Magnets,	N. Mokhov	mokhov@fnal.gov	
opical Contribution	MDI: Reducing Background Loads on Detector	N. Mokhov	mokhov@fnal.gov	
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				R. Lipton, V. Lombardo, N.
opical Contribution	Detector Design Concepts for a Muon Collider	A. Mazzacane	mazzacan@fnal.gov	Terentiev, et al
ub-Section Overview	Neutrino Beam Line Concepts	D. Adey	adey@fnal.gov	JB. Lagrange, A. Liu
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	MOMENT article???	MICE		
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		IDS-NF		

## **Timeline**



- We would like to receive first drafts of identified papers this summer
  - we will be in touch at this meeting with people that have been identified as authors
- Papers will receive initial edits from a group comprised of members from MAP Executive Board, MAP Institutional Board, and MAP project members (L2 mgrs,...)