

Towards Concluding the Dedicated Volume on Muon Accelerators

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LBNL

- 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>

A screenshot of the JINST-Volume website. The header includes the Fermilab logo, a 'Sign In' button, and a search bar. The main content area features the Muon Accelerator Program logo, the U.S. Department of Energy logo, and the title 'JINST-Volume'. Below this, it says 'JINST Special Issue On: "Muon Accelerators for Particle Physics"'. The 'Overview' section states that the Special Issue will include a set of overview articles and individual technical contributions. The 'MAP Author Instructions' section provides detailed guidance for authors, including submission limits, review processes, and contact information for support.

JINST Author Instructions
The JINST article templates (in LaTeX2e and Word formats) are available at:
http://jinst.sissa.it/jinst/help/JINST_TeXclass.jsp

Detailed instructions for authors can be found in the [JINST Author Manual](#).

When your contribution is ready for submission, please follow the instructions below:

1. Connect to <http://jinst.sissa.it>, register (if needed), and login;
2. In the **Submit** section of the JINST home page click on "**submit an article for a special issue**" and choose "**Muon Accelerators for Particle Physics**";

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	<i>The Potential of Muon Accelerator Capabilities</i>	M. Palmer, K. Long	k.long@imperial.ac.uk	All Collabs	
	<i>The U.S. Muon Accelerator Program</i>	M. Palmer	mapalmer@fnal.gov	MAP EC, MASS	
	<i>The Muon Ionization Cooling Experiment</i>	K. Long	k.long@imperial.ac.uk	MICE	
	<i>The International Design Study for a Neutrino Factory</i>	P. Soler	Paul.Soler@GLASGOW.AC.UK	IDS-NF	
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	<i>The IDS-NF Reference Design Report</i>	P. Soler	Paul.Soler@GLASGOW.AC.UK	IDS-NF	
	<i>The NuMAX Long Baseline Neutrino Factory Concept</i>	J.-P. Delahaye	jpd@slac.stanford.edu	MASS & IBS Teams	
	<i>Muon Collider Capabilities</i>	R. Ryne	rdryne@lbl.gov	MAP Collab, MASS & IBS Teams	
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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,...)