



Mu2e-II Workshop (iii) - Introduction

Frank Porter
August 26, 2020
DocDB-nnnnn

This meeting will be recorded

Working Groups

Mu2e-II working groups	Tentative Convenors
Theory MU2EII-THEORY@FNAL.GOV	Julian Heeck Lorenzo Calibbi
Accelerator (including PS, production target, extinction) (TBA)	David Neuffer Eric Prebys
Radiation mitigation (includes radiation simulation) MU2EII-RADIATION@fnal.gov	Vitaly Pronskikh Michael MacKenzie Stefan Mueller
Tracker mu2eii-tracker@fnal.gov	Daniel Ambrose Giovanni Tassielli
Calorimeter (and STM?) mu2eii-calorimeter@listserv.fnal.gov	Ivano Sarra Luca Morescalchi David Hitlin
CRV mu2eii-crv@listserv.fnal.gov	Yuri Oksuzian Craig Dukes
Sensitivity estimate (includes simulation, stopping target) mu2e-ii-sensitivity@listserv.fnal.gov	Lisa Goodenough Sophie Middleton Yuri Oksuzian
Trigger and DAQ mu2e-ii-tdaq@listserv.fnal.gov	Giani Pezzullo Antonio Gioiosa

Letter Of Interest

Read link: <https://www.overleaf.com/read/rmscdsghznbs>

Due August 31, 2020

- Called for signers on **Wednesday, August 5**
 - **105 signatures as of Tuesday, August 25**
- Deadline to respond was **August 19** (but taking late arrivals)
- Will submit to Snowmass before **August 31**

Other “Mu2e-II” LOIs

Topic	Proponents
Production target	K. Lynch, ...
Stopping target monitor	K. Lynch, ...
Calorimeter Draft circulated to listserv list	D. Hitlin, I. Sarra, L. Morescalchi, et al.
Mu2e-II: a trigger-less TDAQ system based on software trigger https://www.overleaf.com/4494769535mbpggbjngpkt	N. H. Tran, et al.
Mu2e-II: TDAQ based on GPU co-processor https://www.overleaf.com/1195943198qrwhwdvyhtfd	N. H. Tran, et al.
Mu2e-II: a 2-level TDAQ system based on FPGA pre-filtering https://www.overleaf.com/9669925525vjrqwjgxpvwf	N. H. Tran, et al.
CRV	CRV working group
Theory https://www.dropbox.com/s/kyo3wjlen4vkcf4/LOI_Mu2e_II_theory.pdf?dl=0	J. Heeck and L. Calibbi (contacts), et al.
Tracker	Tracker working group

Other related LOIs

Topic	Proponents
Physics potential with MEGII-fwd	L. Calibbi et al. https://www.snowmass21.org/docs/files/summaries/RF/SNOWMASS21-RF5_RF6-006.pdf
Muonium Gravity Experiment at Fermilab (MAGE)	D. Kaplan et al. https://www.snowmass21.org/docs/files/summaries/RF/SNOWMASS21-RF0-AF0-005.pdf
A new charged lepton flavor violation program at Fermilab	M. Aoki et al. https://www.snowmass21.org/docs/files/summaries/RF/SNOWMASS21-RF5_RF0-AF5_AF0_Robert_Bernstein-009.pdf
Letter of Interest for an Upgraded Low-Energy Muon Facility at Fermilab	R. Bernstein et al. https://www.snowmass21.org/docs/files/summaries/RF/SNOWMASS21-RF0-AF0-007.pdf

Future Mu2e-II/Snowmass21 Events of interest

- September 14, 2020 Mu2e-II TDAQ workshop
- September 22, 2020 Mu2e-II calorimeter workshop
- **Wednesday, September 23, 2020 (10AM-2PM CT) Mu2e-II workshop**
- September 28-29 – CLFV (RF5) workshop - Meson and Baryon decays
- Snowmass Community Planning Meeting - October 5-8
 - [https://snowmass21.org/2020 oct cpm](https://snowmass21.org/2020_oct_cpm)
 - Registration open mid-August
- Date TBA, October, CLFV – CLFV with high intensity muon factory
- **Wednesday, October 28, 2020 (10AM-2PM CT) Mu2e-II workshop**
- June 2021 Rare/precision frontier meeting

Snowmass Community Planning Meeting - October 5-8

- [https://snowmass21.org/2020 oct cpm](https://snowmass21.org/2020_oct_cpm)
- Registration open mid-August
- Meeting timetable
<https://indico.fnal.gov/event/45129/timetable/#20201005>
- October 5,6,8 Plenary
- October 6,7 “Organized breakout sessions, unorganized chat rooms”
- Details under development, but Mu2e-II likely to group LOIs into ~2-3 presentations in breakout sessions

Mu2e-II workshops

Nearby workshop dates	Links to recordings
Thursday, June 18 https://mu2e-docdb.fnal.gov/cgi-bin/sso/DisplayMeeting?conferenceid=9755	AM: https://caltech.box.com/s/b67edbgtxofaujuoorafm4kfq9owhjd PM: https://caltech.box.com/s/vnsm9nh7qroznt3n6q5n3sn4ut1bswo5
Wednesday, July 29 https://indico.fnal.gov/event/44541/	https://caltech.box.com/s/k45jik5i7uztq2letmaxb93fq3arl0kf
Wednesday, August 26 https://indico.fnal.gov/event/44997/	
Wednesday, September 23	
Wednesday, October 28	

Mu2e-II wiki

- <https://mu2eiiwiki.fnal.gov>
- This is a public wiki page
- If you log in, you can edit
- Added nominal parameter list
 - https://mu2eiiwiki.fnal.gov/wiki/Learn_about_Mu2e-II

Requesting also a private Wiki

- At least to post meeting links, Zoom coordinates, email addresses
- Perhaps calendar of events with links
- Computing instructions

Wiki Mu2e-II parameter list

https://mu2eiiwiki.fnal.gov/wiki/Learn_about_Mu2e-II

Wiki has a table of nominal Mu2e-II parameter values

- The top portion is shown here
- Expect to grow and evolve as the effort evolves
- Additions/Corrections/Comments welcome

Parameter	Nominal value	Units
PIP-II parameters		
Beam energy (kinetic)	800	MeV
	1.28×10^{-10}	J
Particles/pulse	6.7×10^{12}	
I_average in pulse	2	mA
Pulse length	550	μ s
Pulse rep rate	20	Hz
Bunch pattern	programmable	
RF frequency	162.5	MHz
	325	MHz
	650	MHz
Mu2e-II parameters		
Run time/yr	2×10^7	s
Duration of run	3	yr
Total run time	6e7	s
Total linac reps	1.2×10^9	
Extinction	1×10^{-11}	
Beam power	100	kW
Number of bunches	16	(at 162.5 MHz)

Calendar

Wiki already has a calendar of Mu2e-II workshops:

- https://mu2eiiwiki.fnal.gov/wiki/Calendar_of_Workshops

Also, Rare frontier has a calendar:

- https://snowmass21.org/rare/start#calendar_of_meetings

Proposing to provide an editable Mu2e-II calendar on the private Wiki page

- Working group meetings and workshops
- Ad hoc working meetings
- Convenor meetings
- Committee meetings
- Related Snowmass21 events
- Include links to Zoom, agendas

We have a Mu2e-II Slack channel

https://join.slack.com/t/caltech-tka1525/shared_invite/zt-glsr3405-OondWg0KCpBoUJwlr2uyJw

August 26 Mu2e-II workshop agenda

When (CT)	Who	What
10:00-10:20	Frank Porter	Introduction
10:25-10:45	Lisa Goodenough	Working group reports - Sensitivity
10:50-11:10	David Hitlin	Working group reports –Calorimeter
11:15-11:35	Daniel Kaplan	MAGE
11:40-12:10	All	Break
12:10-12:30	Michael Mackenzie	Working group reports – Radiation/Production Solenoid
12:35-12:55	Dan Ambrose	Working group reports – Tracker
13:00-13:15	Antonio Gioiosa	Brief update - TDAQ
13:20-13:35	Eric Prebys	Brief update - Accelerator
13:40-13:50	Julian Heeck	Brief update - Theory
14:00	All	End

Additional Material

Theory group members

Julian Heeck, Convenor, Uva

Lorenzo Calibbi, Convenor, Nankai U

Accelerator group members

David Neuffer, Convenor, FNAL

Eric Prebys, Convenor, UCD

Keegan Harrig, UCD

Andrei Gaponenko, FNAL

Kevin Lynch, CUNY

Diktys Stratakis, FNAL

Radiation simulation and mitigation group members

Michael MacKenzie, Convenor, Northwestern

Vitaly Pronskikh, Convenor, FNAL

Stefan Mueller, Convenor, HZDR

Anna Ferrari, HZDR

Reuven Rachamin, HZDR

Tracker group members

Daniel Ambrose, Convenor, UMinn

Giovanni Tassielli, Convenor, INFN Lecce

Brendan Casey, FNAL

Manolis Kargiantoulakis, FNAL

Mete Yucel, FNAL

Calorimeter group members

David Hitlin, Convenor, Caltech

Luca Morescalchi, Convenor, INFN Pisa

Ivano Sarra, Convenor, LNF

Leo Borrell, Bertrand Echenard, Dexu Lin, Sophie Middleton, James Oyang, Frank Porter, Liyuan Zhang, Renyuan Zhu, Caltech

Eleonara Diociaiuti, Raffaella Donghia, Simona Giovannella, Fabio Happacher, Stefano Miscetti, LNF

Stefano Di Falco, Simone Donati, Antonio Gioiosa, Elena Pedreschi, Franco Spinella, INFN Pisa

Cosmic Ray Veto group members

Yuri Oksuzian, Convenor, ANL

Craig Dukes, Convenor, UVa

TBD

Trigger/DAQ group members

Gianantonio Pezzullo, Convenor, Yale

Antonio Gioiosa, Convenor, INFN Pisa

Rebecca Chislett, UCL

Ryan Rivera, FNAL

Sensitivity estimates group members

Lisa Goodenough, Convenor, FNAL

Sophie Middleton, Convenor, Caltech

Yuri Oksuzian, Convenor, ANL

Rebecca Chislett, UCL

Michael Hedges, Purdue

Cole Kampa, Northwestern

Manolis Kargiantoulakis, FNAL

Michael Mackenzie, Northwestern

Development of scenarios

Exciting and diverse potential future muon program at FNAL

- $g-2$
- $\mu^- \rightarrow e^-, \mu^- \rightarrow e^+, \mu e \rightarrow ee$ conversion
- $\mu \rightarrow eX$
- $\mu \rightarrow e\gamma, \mu \rightarrow eee$
- muonium
- etc.
- Mu2e, Mu2e-II
- induction linac
- surface muon beam
- PRISM muon FFAG ring

Can we develop scenarios for how this could play out?

- Put Mu2e-II in context of a larger program
- Each component of the program stands by itself
- Can we really alternate some of these?

“Working group reports”

Brief initial thoughts from working groups, covering, as relevant

- Physics goals
- Backgrounds
- Status of requirements
- What information is needed from others
- Problems to solve
- Potential technological solutions
- R&D needed

May be continued at August workshop

May become more detailed as progress is made in future meetings

Mu2e-II Snowmass21 Committee

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David Neuffer	FNAL	neuffer@fnal.gov
Yuri Oksuzian	ANL	yoksuzian@anl.gov
Frank Porter (chair)	Caltech	fcp@caltech.edu
Giovanni Tassielli	INFN-Lecce	giovani.tassielli@le.infn.it
Robert Bernstein (ex officio)	FNAL	rhbob@fnal.gov
Jim Miller (ex officio)	Boston U	miller@bu.edu