

## Mu2e-II Workshop (iv) - Introduction

Frank Porter  
September 23, 2020  
DocDB-nnnnn

**This meeting will be recorded**

# Working Groups

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

# Theory group members

Julian Heeck, Convenor, Uva

Lorenzo Calibbi, Convenor, Nankai U

Robert Szafron, CERN

# 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

Karen Byrum, Simon Corrodi, Peter Winter, Lei Xia, ANL

Raymond Culbertson, Gary Drake, Anna Pla-Dalmau, Greg Rakness, FNAL

Akram Artikov, Yuri Davydov, JINR, Dubna

Timothy Bolton, Glenn Horton-Smith, Yurii Maravin, Kres Neely, KSU

Gerald Blazey, Kurt Francis, Sergey Uzunyan, Vishnu Zutshi, NIU

Merrill Jenkins, U South Alabama

Steven Boi, Ralf Ehrlich, Stephen Goadhouse, Craig Group, UVa



# 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

# Liaisons

## Radiation

Accelerator – David Neuffer

Tracker -

Calorimeter – Ivano Sarra

CRV – Yuri Oksuzian

TDAQ – Gianantonio Pezzullo

Sensitivity – Sophie Middleton

## Trigger/DAQ

Tracker – Rebecca Chislett

Calorimeter – Franco Spinella

CRV – Craig Dukes

# Letters Of Interest

Mu2e-II LOI submitted August 31, 2020

**Snowmass21 link:**

[https://www.snowmass21.org/docs/files/summaries/RF/SNOWMASS21-RF5\\_RF0\\_Frank\\_Porter-106.pdf](https://www.snowmass21.org/docs/files/summaries/RF/SNOWMASS21-RF5_RF0_Frank_Porter-106.pdf)

- 109 signatures
- Mu2e-II wiki page with links to LOIs:  
[https://mu2eiiwiki.fnal.gov/wiki/Snowmass21\\_Information#LOIs](https://mu2eiiwiki.fnal.gov/wiki/Snowmass21_Information#LOIs)
  - Mu2e-II LOI
  - Working group LOIs
  - Other relevant LOIs

# Topical Mu2e-II LOIs

(linked on Mu2e-II Wiki)

- [Beam delivery for Mu2e-II](#)
- [Calorimeter](#)
- [Cosmic Ray Veto](#)
- [Production target](#)
- [Stopping target monitor](#)
- [Theory](#)
- [Tracker](#)
- [Trigger/DAQ, 2 level, FPGA, scheme A](#)
- [Trigger/DAQ, 2 level, FPGA, scheme B](#)
- [Trigger/DAQ, 2 level, GPU](#)
- [Trigger/DAQ, software trigger](#)

# Other related LOIs

(linked on Mu2e-II Wiki)

- [Bound  \$\mu \rightarrow ae\$  decays](#)
- [Bunch compressor for PIP-II](#)
- [CLFV program at Fermilab](#)
- [COMET](#)
- [Crystal R&D](#)
- [DeeMe](#)
- [MAGE](#)
- [MEG-II](#)
- [MEGII-fwd physics](#)
- [Mu2e](#)
- [\$\mu \rightarrow e\$  with PRISM](#)
- [\$\mu^- \rightarrow e + \gamma\$](#)
- [\$\mu^- \rightarrow e^+\$  and RMC](#)
- [\$\mu \rightarrow e \gamma\$](#)
- [muonium oscillations](#)
- [Rare muon decays and light new physics](#)
- [Upgraded low energy muon facility at Fermilab](#)

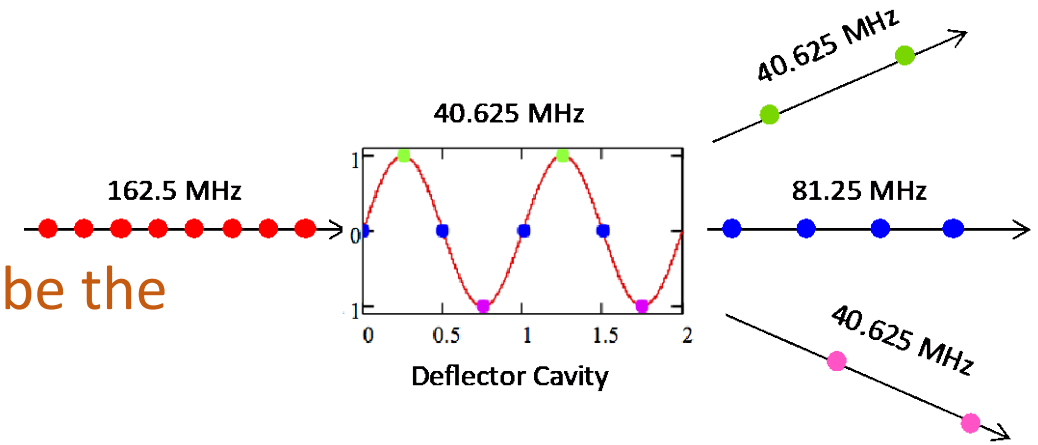
# Contributed Paper

- Next (and final) product is Contributed Paper, deadline July 31, 2021
  - Will prepare an outline and framework on Overleaf (read link):  
<https://www.overleaf.com/read/mrbgttkmfgvq>

# Mu2e-II beam assumptions

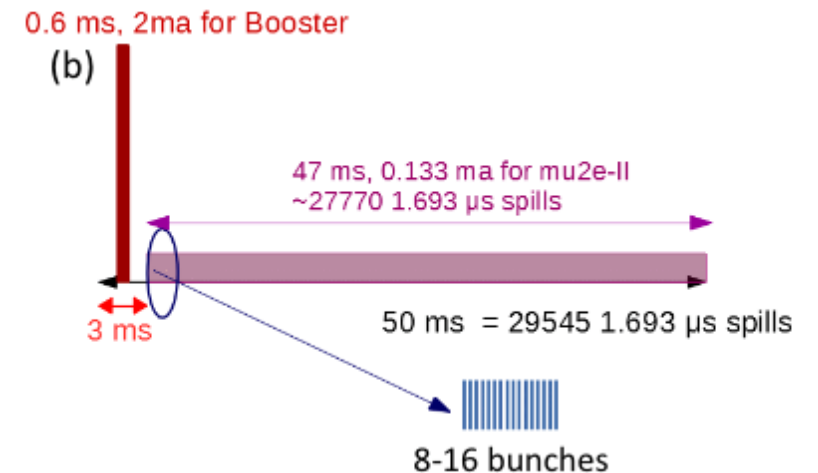
At last Mu2e-II workshop, Eric Prebys discussed assumption of  $\frac{1}{2}$  of PIP-II “CW” beam to Mu2e-II  
David Neuffer looked at LOIs – Mu2e-II seems to be the only effort requiring “CW” beam

- Is this a problem or an opportunity?
  - Problem – “little” demand for CW beam (existential issue?)
  - Opportunity – more beam for Mu2e-II?
- Many ways to think about this
  - More (up to x2) sensitivity or stopping targets
  - Less calendar time for a result
- Even opportunity is presents “problems”
  - Higher power, higher rates, ...
- **Should we be prepared to accept 162.5 MHz beam?**



Eric Prebys

<https://indico.fnal.gov/event/44997/>





# Mu2e-II Communication

- Public wiki page: <https://mu2eiiwiki.fnal.gov>
  - Please augment/update/correct nominal parameter list
    - [https://mu2eiiwiki.fnal.gov/wiki/Learn\\_about\\_Mu2e-II](https://mu2eiiwiki.fnal.gov/wiki/Learn_about_Mu2e-II)
  - Some write access issues being investigated
- Requested also a private Wiki
- Mu2e-II Slack channel invite link:
  - [https://join.slack.com/t/caltech-tka1525/shared\\_invite/zt-glsr3405-OondWg0KCpBoUJwlr2uyJw](https://join.slack.com/t/caltech-tka1525/shared_invite/zt-glsr3405-OondWg0KCpBoUJwlr2uyJw)

# Future Mu2e-II/Snowmass21 Events of interest

- September 28-29 – CLFV (RF5) workshop - Meson and Baryon decays
- **Friday, October 2, 2020 – Rare frontier meeting (next slide...)**
- Snowmass Community Planning Meeting - October 5-8 (next slide...)
- Date TBA, 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

- Links
  - [https://snowmass21.org/2020 oct cpm](https://snowmass21.org/2020_oct_cpm)
  - Registration and Indico page  
<https://indico.fnal.gov/event/44870/>
  - Meeting timetable  
<https://indico.fnal.gov/event/45129/timetable/#20201005>
- October 5,6, 8 Plenary
- October 6,7 “Organized breakout sessions, unorganized chat rooms”
- It appears that the CPM program will be “high level”, driven by Snowmass convenors
- However, a rare frontier program is planned for Friday, October 2
  - Mu2e-II can expect to be asked for a presentation there, maybe 10-15 minutes
  - Rebecca Chislett will present on behalf of Mu2e-II

# Mu2e-II workshops

Nearby workshop dates	Links to recordings
Thursday, June 18 <a href="https://mu2e-docdb.fnal.gov/cgi-bin/sso/DisplayMeeting?conferenceid=9755">https://mu2e-docdb.fnal.gov/cgi-bin/sso/DisplayMeeting?conferenceid=9755</a>	AM: <a href="https://caltech.box.com/s/b67edbgtxofaujuoorafm4kfq9owhjd">https://caltech.box.com/s/b67edbgtxofaujuoorafm4kfq9owhjd</a> PM: <a href="https://caltech.box.com/s/vnsm9nh7qroznt3n6q5n3sn4ut1bswo5">https://caltech.box.com/s/vnsm9nh7qroznt3n6q5n3sn4ut1bswo5</a>
Wednesday, July 29 <a href="https://indico.fnal.gov/event/44541/">https://indico.fnal.gov/event/44541/</a>	<a href="https://caltech.box.com/s/k45jik5i7uztq2letmaxb93fq3arl0kf">https://caltech.box.com/s/k45jik5i7uztq2letmaxb93fq3arl0kf</a>
Wednesday, August 26 <a href="https://indico.fnal.gov/event/44997/">https://indico.fnal.gov/event/44997/</a>	<a href="https://caltech.box.com/s/ws8hkzmjo96xlnile8q27yphb87nlpjp">https://caltech.box.com/s/ws8hkzmjo96xlnile8q27yphb87nlpjp</a>
Wednesday, September 23 <a href="https://indico.fnal.gov/event/45632/">https://indico.fnal.gov/event/45632/</a>	<b>Today</b>
Wednesday, October 28	
Wednesday, December 9	

# September 23 Mu2e-II workshop agenda

When (CT)	Who	What
10:00-10:20	Frank Porter	Introduction
10:25-10:45	Sophie Middleton	Working group reports - Sensitivity
10:50-11:10	Michael MacKenzie	Radiative muon capture background
11:15-11:35	Julian Heeck	Brief update - Theory
	Eric Prebys, David Neuffer	Brief update - Accelerator
11:40-12:10	All	Break
12:10-12:40	Luca Morescalchi	Report from calorimeter workshop
12:45-13:15	Rebecca Chislett	Report from TDAQ workshop
13:20-13:50	Craig Dukes, Yury Oksuzian	Brief update – CRV
	Dan Ambrose, Giovanni Tassielli	Brief update - Tracker
	Vitaly Pronskikh	Brief update - Radiation
14:00	All	End

**Indico timetable at:** <https://indico.fnal.gov/event/45632/>

# Additional Material

# Mu2e-II Snowmass21 Committee

Name	Institution	Email
Dan Ambrose	U Minn	ambrose0028@gmail.com
Rebecca Chislett	UC London	rebecca.chislett@ucl.ac.uk
Lisa Goodenough	FNAL	goodenou@fnal.gov
Julian Heeck	U Virginia	julian.heeck@gmail.com
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

# Calendar

Wiki already has a calendar of Mu2e-II workshops:

- [https://mu2eiiwiki.fnal.gov/wiki/Calendar\\_of\\_Workshops](https://mu2eiiwiki.fnal.gov/wiki/Calendar_of_Workshops)

Also, Rare frontier has a calendar:

- [https://snowmass21.org/rare/start#calendar\\_of\\_meetings](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