

# Mu2e-II Workshop (vii) - Introduction

Frank Porter  
March 3, 2021  
DocDB-37229

**This meeting will be recorded**

# Mu2e-II workshops

Workshop dates	Links to recordings
<b>Thursday, June 18</b> <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>
<b>Wednesday, July 29</b> <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>
<b>Wednesday, August 26</b> <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>
<b>Wednesday, September 23</b> <a href="https://indico.fnal.gov/event/45632/">https://indico.fnal.gov/event/45632/</a>	<a href="https://caltech.zoom.us/rec/play/_xbOzK448M0VhhDArf9UE8AjiOKdshh4et0tYOOhtViPn3qveG95CkQUOHQ0_SzeJ8pxVzw5M0PolvjD.l-zdhaNXvu3i5SI?autoplay=true&amp;startTime=1600873315000">https://caltech.zoom.us/rec/play/_xbOzK448M0VhhDArf9UE8AjiOKdshh4et0tYOOhtViPn3qveG95CkQUOHQ0_SzeJ8pxVzw5M0PolvjD.l-zdhaNXvu3i5SI?autoplay=true&amp;startTime=1600873315000</a>
<b>Wednesday, October 28</b> <a href="https://indico.fnal.gov/event/45937/">https://indico.fnal.gov/event/45937/</a>	<a href="https://caltech.zoom.us/rec/share/zCGxa2uJwAKwONXm7pyiqrrLPJvixTaNHkY2cxHRDjtmBmWOYgraV8D9ynUMATk.JNeSkLhSj4-Hfcof">https://caltech.zoom.us/rec/share/zCGxa2uJwAKwONXm7pyiqrrLPJvixTaNHkY2cxHRDjtmBmWOYgraV8D9ynUMATk.JNeSkLhSj4-Hfcof</a>
<b>Wednesday, December 9</b> <a href="https://indico.fnal.gov/event/46433/">https://indico.fnal.gov/event/46433/</a>	<a href="https://caltech.zoom.us/rec/share/xXVV4YURBMeRsnF0GLQsGAPv-FJ466HNnTGze3VeiAoooyUcRSU7cP16QBwlvNPv.XvSqSC_JVmuSKVA9">https://caltech.zoom.us/rec/share/xXVV4YURBMeRsnF0GLQsGAPv-FJ466HNnTGze3VeiAoooyUcRSU7cP16QBwlvNPv.XvSqSC_JVmuSKVA9</a>
<b>Wednesday, March 3</b> <a href="https://indico.fnal.gov/event/47787/">https://indico.fnal.gov/event/47787/</a>	

# Mu2e-II Working Groups

Mu2e-II working groups	Convenors
Theory <a href="mailto:mu2eii-theory@fnal.gov">mu2eii-theory@fnal.gov</a>	Lorenzo Calibbi Julian Heeck
Accelerator (including PS, production target, extinction) <a href="mailto:mu2e-ii-accelerator@fnal.gov">mu2e-ii-accelerator@fnal.gov</a>	Karie Badgley 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:mu2eii-tdaq@listserv.fnal.gov">mu2eii-tdaq@listserv.fnal.gov</a>	Antonio Gioiosa Giani Pezzullo

# Accelerator

Karie Badgley, Convenor, FNAL

David Neuffer, Convenor, FNAL

Eric Prebys, Convenor, UCD

Mary Anne Cummings, Muons, Inc.

Keegan Harrig, UCD

Andrei Gaponenko, FNAL

Vadim Kashikhin, FNAL

Kevin Lynch, CUNY

James Popp, CUNY

Diktys Stratakis, FNAL

- TBD, 2021 (10-12 CT): AF2/AF5/AF7/RP/NP target workshop (contact: Eric Prebys)  
<https://indico.fnal.gov/event/46752/>

# Radiation simulation and mitigation

Michael MacKenzie, Convenor, Northwestern

Stefan Mueller, Convenor, HZDR

Vitaly Pronskikh, Convenor, FNAL

Anna Ferrari, Reuven Rachamin, HZDR

Vadim Kashikhin, FNAL

James Popp, CUNY

David Pushka, FNAL

Yuri Oksuzian – CRV

Sophie Middleton – Sensitivity

Giani Pezzullo - TDAQ

# Theory

Lorenzo Calibbi, Convenor, Nankai U

Julian Heeck, Convenor, UVa

Robert Szafron, CERN

Yuichi Uesaka, Kyushu Sangyo University

# Tracker

Daniel Ambrose, Convenor, UMinn

Giovanni Tassielli, Convenor, INFN Lecce

David Brown, LBNL

Brendan Casey, FNAL

Manolis Kargiantoulakis, FNAL

James Popp, CUNY

Mete Yucel, FNAL

Tracker meetings every two weeks on Tuesdays 11:15AM CT  
Next meeting Tuesday, March 16

# Calorimeter

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

Eleonora 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

Craig Dukes, Convenor, Uva

Yuri Oksuzian, Convenor, ANL

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

Antonio Gioiosa, Convenor, INFN Pisa

Gianantonio Pezzullo, Convenor, Yale

Richard Bonventre, LBNL

Rebecca Chislett, UCL, [Tracker](#)

Raffaella Donghia, LNF

Bertrand Echenard, Caltech

Ryan Rivera, FNAL

Franco Spinella, INFN Pisa – [Calorimeter](#)

Craig Dukes, UVa - [CRV](#)

# Sensitivity estimates

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

# Snowmass 22 Planning – “covid pause”

## January Snowmass newsletter:

[https://indico.fnal.gov/event/47394/attachments/139229/175180/Snowmass Newsletter Jan.2021.pdf](https://indico.fnal.gov/event/47394/attachments/139229/175180/Snowmass_Newsletter_Jan.2021.pdf)

<https://snowmass21.org/announcements>

- **High-level activities on hold until the end of June 2021**
  - Includes Frontier-level and Topical Group-level workshops, All-conveners meetings, Advisory Group meetings and Newsletters.
- **Other Topical Group and cross-frontier activities paused or reduced to a significantly lower level, proceeding only as necessary to ensure:**
  - scientific continuity
  - meet essential programmatic needs
  - maintain collaborative work with other units and communities
- No critical decisions will be made during the hiatus
- No individuals obligated to participate in these activities
- **Individual, collaborative and self-organized work can continue at the discretion of the individuals involved**

# Snowmass 22 - Endgame Schedule

- **White Paper submission to arXiv: no later than March 15, 2022**
  - Late submissions and updates unlikely to be incorporated in the working group reports
- Preliminary reports by the Topical Groups due: no later than May 31, 2022
- Preliminary reports by the Frontiers due: no later than June 30, 2022
- Snowmass Community Summer Study (CSS): July 2022 at UW-Seattle
- Final reports by Frontiers due: no later than September 30, 2022
- Snowmass Book and on-line archive documents due: October 31, 2022

# Snowmass 22 RP Frontier Schedule

## Rare Processes & Precision Measurements Frontier

The rare processes and precision measurements frontier plans to pause activities until the end of August

- Will be about three “heartbeat” status meetings among the topical group conveners in that time but no workshops
  - CLFV coffee hour
    - First one was Feb 25, 2021
    - Watch Snowmass CLFV email; I’ll post future ones on the Mu2e-II calendar
- Community members should pursue their individual physics interests as they wish
- At the end of August, will resume activities again with a schedule to be determined
- Plan to postpone Frontier meeting by one year to around May 2022.

# Mu2e-II Snowmass Schedule

Main new information for us is the March 15, 2022 deadline for submission of Mu2e-II contribution to arXiv

- This will serve as the input to the Topical Group Convenors
  - Their deadline for preliminary reports is May 31, 2022
- Mu2e-II aims for a “good first draft: by February 1, 2022
  - Not so long from now!

Outline and framework on Overleaf (read link):

<https://www.overleaf.com/read/mrbgttkmfgvq>

Let me know if you would like the Edit link

# Mu2e-II talks

Discussion with Kevin Lynch, Mu2e Speakers Bureau Chair

- “Mu2e-II” talks for CPAD (Mar 18-22), APS (Apr 17-20), IPAC21 (May 24-28)
  - Extinction monitor (?)
  - Calorimeter (David Hitlin – SiPMs, Renyuan Zhu – crystals)
  - Tracker (Dan Ambrose)
  - Production target (Vitaly Pronskikh)
  - TDAQ (Richie Bonventre)



# Speakers Bureau

## Purpose of a speakers bureau:

- Spread public talks among deserving speakers
  - Junior speakers
  - Diversity
  - Career advancement
- Quality control
  - Review of material to be presented
  - Suggestions for improvements in presentation

# Mu2e-II talks - approaches

Some possible ways to handle Mu2e-II talks, from Kevin Lynch (edited)

- 1) Keep it wild west for now
- 2) Give the Mu2e Speakers Committee "jurisdiction" at some level of formality
- 3) Give Mu2e-II committee jurisdiction
- 4) Hybrid of 2 and 3 where one or more Mu2e-II committee members "join" the Mu2e Speakers Committee for Mu2e-II talk issues
- 5) Delegate to 2 or 3 case-by-case
- 6) Some other idea?

Some presentations today serve as “practice talks”

# Mu2e-II talks

- If you plan to submit an abstract or give a Mu2e-II talk, or are invited to give such a talk, please
  - Email [Kevin Lynch](#) and [Frank Porter](#)
  - If you have an invitation, please email us even if you do not wish to accept – we may be able to suggest someone else
- Fermilab requirements – writeups
  - Acknowledgment should usually include:
    - This document was prepared by members of the Mu2e-II Collaboration using the resources of the Fermi National Accelerator Laboratory (Fermilab), a U.S. Department of Energy, Office of Science, HEP User Facility. Fermilab is managed by Fermi Research Alliance, LLC (FRA), acting under Contract No. DE-AC02-07CH11359.
  - Fermilab preprint number
    - <https://mu2e-docdb.fnal.gov/cgi-bin/private/ShowDocument?docid=4083>
- Propose with byline:
  - “For the Mu2e-II Collaboration”
  - Optionally as applicable; “For the <appropriate group name> working group of the Mu2e-II Collaboration”

# Mu2e-II Collaboration (author list)

- So far, closest things to a collaboration list we have in Mu2e-II is
  - LOI author list
  - Mu2e-II mailing list
  - Mu2e-II working group participant lists
- It would be convenient to have a standing author list
  - Probably not just the Snowmass white paper
  - Cumbersome to ask for authors every time
    - Likely to miss people under principle that people have to explicitly sign
    - A lot of tedious work
- For some people, useful to have a formal connection
  - I.e., membership in “Mu2e-II collaboration”
  - If we have a standing author list, that can define the collaboration
- Plan to create a standing “Mu2e-II Collaboration List”
  - Identical with the standing author list
  - A subset of the Mu2e-II email list
  - Publications announced to email list; default is authorship, individuals may remove themselves

# Mu2e-II Communication

- Public wiki page: <https://mu2eiiwiki.fnal.gov>
  - Please email Lisa or Frank if you wish to have write access
- Private wiki page:  
[https://mu2eii-internal-wiki.fnal.gov/wiki/Main\\_Page](https://mu2eii-internal-wiki.fnal.gov/wiki/Main_Page)
  - SSO log-on
  - Need to contact Lisa or Frank to request access
  - This page has the Mu2e-II calendar with links to zoom, indico, etc.
- Mu2e-II mailing list: [mu2eii@listserv.fnal.gov](mailto:mu2eii@listserv.fnal.gov)
- 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)

# Mu2e-II Calendar

- On main page of private Wiki

[https://mu2eii-internal-wiki.fnal.gov/wiki/Main\\_Page](https://mu2eii-internal-wiki.fnal.gov/wiki/Main_Page)

February 2021

Su	Mo	Tu	We	Th	Fr	Sa
	<b>1 convenors</b>	<b>2</b>	<b>3</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>
<b>14</b>	<b>15 convenors</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>
<b>21</b>	<b>22 committee</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>
<b>28</b>						

March 2021

Su	Mo	Tu	We	Th	Fr	Sa
	<b>1</b>	<b>2</b>	<b>3 workshop</b>	<b>4</b>	<b>5</b>	<b>6</b>
<b>7</b>	<b>8</b>	<b>9</b>	<b>10</b>	<b>11</b>	<b>12</b>	<b>13</b>
<b>14</b>	<b>15</b>	<b>16</b>	<b>17</b>	<b>18</b>	<b>19</b>	<b>20</b>
<b>21</b>	<b>22</b>	<b>23</b>	<b>24</b>	<b>25</b>	<b>26</b>	<b>27</b>
<b>28</b>	<b>29</b>	<b>30</b>	<b>31</b>			

Clicking on date  
provides details

## **Mu2e-II workshop 8-12 CT March 3, 2021** [\[edit\]](#)

Indico page: <https://indico.fnal.gov/event/47787/>

Zoom coordinates:

Frank C. Porter is inviting you to a scheduled Zoom meeting.

Topic: Mu2e-II Snowmass21 Workshop (vii) Time: Mar 3, 2021 10:00 AM Central Time

Join Zoom Meeting: <https://caltech.zoom.us/j/86511960956>

Meeting ID: 865 1196 0956

# Mu2e-II at Mu2e Collaboration Meeting

- Sophie Middleton will give Mu2e-II summary at Mu2e collaboration meeting
- Saturday, March 13 at 1:30PM (CT)

Mu2e CM SCHEDULE

SCHEDULE START TIME	TIME INTERVAL	WEEK START DATE
10:00 AM	35 MIN	3/8/2021

TIME	MON(WG) March 8, 2021	TUES(WG) March 9, 2021	WED(WG) March 10, 2021	THURS(WG) March 11, 2021	FRI(PLENARY) March 12, 2021	SAT(PLENARY) March 13, 2021
9:00 AM				Executive Board Meeting	Publications Board Meeting	9:45 IB Report
10:00 AM	Tracker, Calorimeter WG	Integration, Soft/Comp WG	CRV, Ext Mon WG	STM, Simulations, Trigger WG	10:00 Introduction	Tracker
10:35 AM	Tracker, Calorimeter WG	Integration, Soft/Comp WG	CRV, Ext Mon WG	STM, Simulations, Trigger WG	10:30 Project (R. Ray or J. Whitmore)	Calorimeter
11:10 AM	Tracker, Calorimeter WG	Integration, Soft/Comp WG	CRV, Ext Mon WG	STM, Simulations, Trigger WG	Integration/Installation Schedule	Cosmic Ray Veto
11:45 AM	Tracker, Calorimeter WG	Integration, Soft/Comp WG	CRV, Ext Mon WG	STM, Simulations, Trigger WG	Accelerator	Computer/Software Report (D. Brown)
12:20 PM	Lunch	Lunch	Lunch	Lunch	Lunch	Lunch
12:55 PM	Tracker, Calorimeter WG	Integration, Soft/Comp WG	CRV, Ext Mon WG	STM, Simulations, Trigger WG	EDI Talk (Frazier Benya)	Simulation Report
1:30 PM	Tracker, Calorimeter WG	Integration, Soft/Comp WG	CRV, Ext Mon WG	STM, Simulations, Trigger WG	Solenoids	Mu2e-II
2:05 PM	Tracker, Calorimeter WG	Integration, Soft/Comp WG	CRV, Ext Mon WG	STM, Simulations, Trigger WG	Trigger	
2:40 PM			Young Mu2e	IB Meeting		

# March 3 Mu2e-II workshop agenda

Indico timetable at: <https://indico.fnal.gov/event/47787/>

When (CT)	Who	What
10:00-10:20	Frank Porter	Introduction
10:20-10:45	Yuri Oksuzian	CRV - report from Dec 11 workshop
10:45-11:10	Vitaly Pronskikh	Production target – (APS/IPAC)
11:10-11:30	David Hitlin	Calorimeter Readout (CPAD)
11:30-11:55	Renyuan Zhu	Calorimeter Crystals (CPAD)
12:00-12:30	All	Break
12:30-12:55	Dan Ambrose	Tracker (CPAD)
12:55-13:20	Sophie Middleton	Sensitivity – stopping targets
12:20-13:30	Stefan Mueller	Radiation studies – brief report
13:30-13:40	Eric/Karie/David	Accelerator - brief report
13:40-13:50	Julian Heeck	Theory – brief report
13:50-14:00	Antonio/Giani	TDAQ – brief report
14:00	All	End



Next Mu2e-II workshop:  
Late April or Early May?

PIP-II presentation planned  
Production Solenoid – Karie Badgley

# Additional Material

# Contributed Paper – Proposed Top Level Outline

- I. Overview
  - II. Theory
  - III. Accelerator and beam line
  - IV. Production target and environment
  - V. Solenoids
  - VI. Radiation
  - VII. Tracking
  - VIII. Calorimetry
  - IX. Cosmic ray veto
  - X. Trigger and Data Acquisition
  - XI. Physics sensitivity
- References

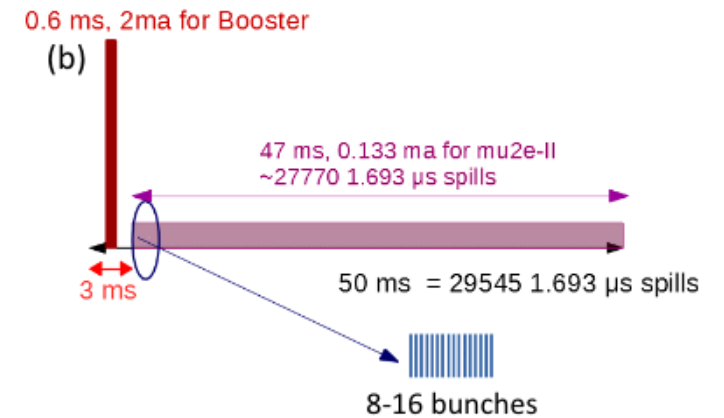
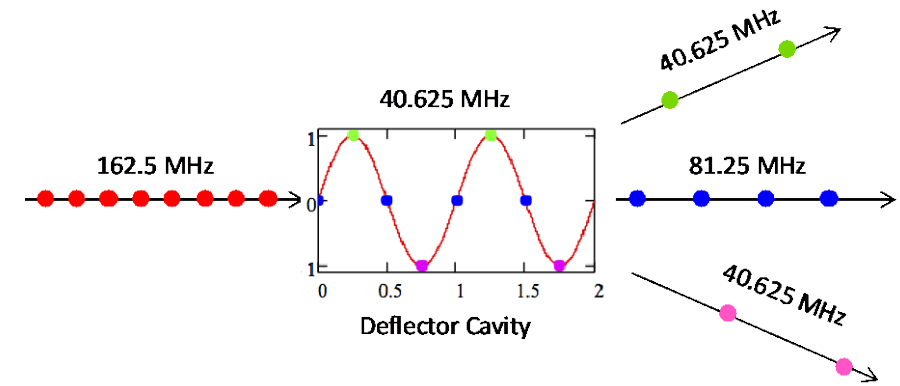
# Proposed Mu2e-II beam nomenclature

- Follow accelerator group usage
- Beam delivery is different than Mu2e

Quantity	Name
Beam in one PIP-II RF bucket (162.5 MHz)	Bunch
PIP-II pulse (20 Hz/0.55 ms)	Pulse (but see below)*
Mu2e-II repetition (e.g., 1693 ns)	Spill (also pulse, but see above)**
Set of bunches in one spill (e.g., 8)	Burst (also pulse, but see above)**

\*One PIP-II pulse is about 27770 Mu2e-II spills; suggest saying “PIP-II pulse” to avoid confusion.

\*\*“Pulse” may be used when distinction is not important



Eric Prebys

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

David Neuffer, DocDB 33896

# 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