CLFV with high intensity muon factories

Snowmass 2021 – RF05

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Introduction

This workshop will discuss ideas and challenges for building a next-generation high intensity muon factory.

The goal of this workshop are to

- Stimulate new ideas and a vision for the future. Be bold and dream big!
- Develop collaborations between next generation CLFV proposals.
- Develop synergies with other efforts, such as the muon collider or neutrino factories. There are significant challenges common to multiple proposals!
- Convey the importance and excitement of a high intensity muon factory to the rest of the community.

This event is part of a series of workshops on charged lepton flavor violation organized by RF05. The schedule (including past events) can be found on the CLFV topical group page: *https://snowmass21.org/rare/clfv*

Introduction

Several LOIs related to this topic were already submitted to our topical group (RF05):

- Upgraded Low-Energy Muon Facility at Fermilab,
  D. Kaplan (kaplan@iit.edu) RF/SNOWMASS21-RF0-AF0-007.pdf
- A New Charged Lepton Flavor Violation Program at Fermilab
  R. Bernstein (rhbob@fnal.gov) RF/SNOWMASS21-RF5_RF0-AF5_AF0_Robert_Bernstein-027.pdf
- A Phase Rotated Intense Source of Muons for a $\mu \rightarrow e$ Conversion Experiment
  J. Pasternak (j.pasternak@imperial.ac.uk) RF/SNOWMASS21-RF5_RF0-AF5_AF0_J_Pasternak-096.pdf
- Bunch Compressor for the PIP-II Linac
  E. Prebys (eprebys@ucdavis.edu) AF/SNOWMASS21-AF5_AF0-RF5_RF0_Prebys2-203.pdf
- A new experiment for the $\mu \rightarrow e\gamma$ search
  G. Tassielli (giovanni.tassielli@le.infn.it) RF/SNOWMASS21-RF5_RF0_Tassielli-067.pdf

Feel free to get in touch with the authors or the TG conveners if you would like to contribute, or if you have other ideas.

Agenda

CLFV – High intensity muon factories

9:00 AM → 9:15 AM **Introduction**
Speaker: Bertrand Echenard (Caltech)

9:15 AM → 9:40 AM **PRISM / PRIME experiments at J-PARC**
Speaker: Akira Sato (Osaka University)

9:40 AM → 10:05 AM **High Intensity Muon Beam (HiMB) at PSI**
Speaker: Dr Andreas Knecht (PSI)

10:05 AM → 10:30 AM **Low energy muon facility at FNAL**
Speaker: Daniel Kaplan (Illinois Institute of Technology)

10:30 AM → 10:55 AM **New experimental concepts for mu -> e gamma**
Speaker: Giovanni Francesco Tassielli (INFN LE, Universita' G. Marconi, Fermilab)

10:55 AM → 11:15 AM **Coffee / lunch break**

11:15 AM → 11:40 AM **PIP II and high intensity muon beam at FNAL**
Speaker: Eric Prebys

11:40 AM → 12:05 PM **FFA for high intensity muon beam at FNAL**
Speaker: Jaroslaw Pasternak (Imperial College/RAL-STFC)

12:05 PM → 12:30 PM **MegaWatt targetry**
Speakers: David Neuffer (Fermilab), Vitaly Pronskikh (Fermilab)

CLFV TG timeline

The CLFV topical group is currently discussing the organization of white papers with the authors of the LOIs. The goal is to consolidate some of the LOIs and write a few impactful papers while keeping the opportunity to discuss in more details some topics.

We plan to organize a discussion mid-January (date TBD) to present the white papers and discuss the next steps.

We'll continue to have informal meeting until April (coffee hour with your conveners) to discuss progress, questions, issues,….

The current goal is to have a preliminary WP drafts for end of April. As you surely know, there are on-going discussion about the Snowmass timeline, and we'll revise this plan if needed.

As we already said, you should feel free to propose a WP if you have a good idea, even if you haven't submitted a LOI!

Other announcement

Beam Physics with a Booster Accumulator Ring BAR

Dear Colleagues,

The Snowmass LOI process has provided an opportunity to engage the community across frontiers and understand needs and opportunities.

As a continuation of that process, we will have a one-day cross-frontier virtual workshop on **December 15th** to discuss the concept of installing a constant field proton accumulator ring in the Booster tunnel [1] and the HEP dark sector, neutrino, and charged lepton flavor violation search physics that could benefit.

The workshop will be roughly segmented into BAR design consideration and implementation in the morning (9:30 am CST - noon), while the afternoon (1 - 3 pm CST) will be dedicated to HEP science opportunities. More details can be found on the meeting page: https://indico.fnal.gov/event/46607/.

Please let us know if you are interested in joining by **registering on the indico link.** Thanks,

- Matt Toups & Bill Pellico

Today’s workshop

The meeting will be recorded, and it seems that the file size depends on how many people share their video. We would appreciate if everybody but the speaker could turn off the video feed to limit file size.

Please raise hands to ask questions, we have allotted some time for discussion at the end of each talk.

Feel free to use the chat to communicate in the meantime, and repost important questions / comments to our slack channel (rpf-05-clfv).

Enjoy the workshop