RF05 – Charged Lepton Flavor Violation

Rare and Precision Frontier Convener Meeting - Dec 1, 2020

S. Davidson (Lyon), B. Echenard (Caltech)

White paper – consolidating LOIs 1/2

Theory – under discussion to understand if we have a single theory WP or several

Rare muon decays and light new physics
Physics potential with MEGII-fwd
Possibility of Search for Bound μ- → e−a Decay
Searching for μ- → e+ Conversion at Upcoming …. Radiative Muon Capture
Search for Muon to Positron Conversion in μ- → e- Conversion Experiments
Theory challenges and opportunities of Mu2e-II **(also in Mu2e II WP)**

Muonium-antimuonium – single WP combining theory + experiments, choosing editor

Physics of muonium and anti-muonium oscillations
Search for Muonium to Antimuonium Conversion (MACE)

Current muon-to-electron conversion – under discussion to combine into single WP

Search for μ-e Conversion by using Muonic Atoms …..Target (DeeMe)
COMET
Mu2e

Current mu → e gamma – authors contacted to inquire about writing WP

The MEG II experiment and its future developments

Mu2e II – all LOIs combined, editor F. Porter

All Mu2e-II stuff (13 LOIs)

Tau – single summary paper with S. Banerjee as editor

Tau Physics and Precision Electroweak Physics ….. at SuperKEKB/Belle II
Physics Potential of a Super tau-Charm Facility*
Precision experiments at Super Charm-Tau Factory*
Physics in the t-charm Region at BESIII
-- Contact EIC to understand if they want to contribute

White paper – consolidating LOIs 2/2

Low-energy muon facility at FNAL – D. Kaplan as WP editor

Upgraded Low-Energy Muon Facility at Fermilab

New facility at FNAL – ENIGMA – authors contacted to finalize content

A New Charged Lepton Flavor Violation Program at Fermilab
A Phase Rotated Intense Source of Muons (PRISM) for a $\mu \rightarrow e$ Conversion Experiment
Bunch Compressor for the PIP-II Linac

New experiment for mu → e gamma – authors contacted to understand if this will be part of the new facility WP, combined with MEG II or a standalone paper.

A new experiment for the $\mu \rightarrow e\gamma$ search

High-energy colliders – author contacted to inquire about writing WP

Charged Lepton Flavour Violation at the FCC-ee

Calendar

December (ongoing)
WP consolidation---authors discussing. If they agree, they tell us WP editor and outline (+timeline). We put this info on wiki page.

December 10
Workshop on CLFV with high intensity muon factory
Indico page: https://indico.fnal.gov/event/46669/

January (TBD)
TG meeting to present(advertise to community) white paper topics+their editors

February – April
« Coffee hour with your conveners » – every three or four weeks
discuss status/progress of WP
(+remind authors we would like draft WP by April...to write TG report)

mid-June
Preliminary TG report drafted (one month before CSS)
circulates for comments

CSS second draft TG report

TG report structure

Organized by topic (default)

Motivation – theory overview
- Motivation to search for CLFV
- Complementarity with other frontiers / probes
- Theory overview

Muon
- Current situation (conversion + decays + oscillations)
- New proposals at existing facilities (MACE, Mu2e II, mu -> eγ)

Tau
- Current situation and near term perspectives

Heavy state decays
- Current situation + perspectives + link to EF02/09

Meson / baryon decays
- Current situation + perspectives + link to RF01/02

Next generation facilities
- Low energy muons
- High intensity muon facility + experiments

Conclusion and perspectives

Organized by timeline (alternative choice)

Motivation – theory overview
- Motivation to search for CLFV
- Complementarity with other frontiers / probes
- Theory overview

Current situation
- Muon conversion, decays and oscillations
- Tau
- Heavy states
- Meson / baryon decays

New opportunities at existing facilities
- Mu2e II @ PIP II
- MACE @ EMuS in China
- New mu -> e gamma @ PSI or FNAL
- Taus

Next generation facilities
- Low energy muons
- High intensity muon facility + experiments
- Tau (if any)
- Heavy states (if any)

Conclusion and perspectives