RF05 – Charged Lepton Flavor Violation

Rare and Precision Frontier Convener Meeting - August 20, 2020

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Current efforts

Our main activities are centered around the series of CLFV workshop:

- July 2 : CLFV in muon decays and transitions
- July 23: CLFV in tau decays and transitions
- **Sep 3:** CLFV in heavy states decay, organized with EF02 and EF05
- **Sep 28-29**: Lepton flavor violation and lepton universality violation in meson and baryon decays with RF01 / RF02
- **TBA**: CLFV with high intensity muon factory with AF05

The workshop on meson and baryon decays was originally planned for Aug 13, but we decided to extend the scope and include lepton universality violation to attract a wider audience $\rightarrow$ two days workshop end of September.

The workshop on “CLFV with high intensity muon factory” originally planned for end of September will have to be postponed to end of October or beginning of November since the CPM has been moved to the week of Oct 5.

So far, the formula has been quite successful, about 40-60 participants from US, Europe and Asia.

Current efforts (cont'd)

Cross-frontier activities

- Started discussions with TF07 (collider phenomenology) to understand the synergies with RF05. Sacha will serve as liaison
- Discussion with EF02 / EF05 on CLFV in heavy state decays (workshop co-organizer)
- Discussion with RF01 / RF02 on CLFV in meson / baryon decay (workshop co-organizer)
- Discussion with AF05 regarding development of high intensity muon factory for CLFV studies in muon decays and transitions (see next page)
- Expect to start discussions with instrumentation frontier and computing frontier after we receive LOIs (e.g. Mu2e II will submit several instrumentation / computing oriented LOIs)

Benchmark model

Not required (in principle) for heavy New Physics , described in EFT. Benchmarks for light new LFV particles (Z', axion…) tbd with RF6, Neutrino Frontier,...

Current efforts (cont'd)

High intensity muon factory at FNAL

- Small group of people to discuss possibilities to develop a high intensity muon factory at FNAL using PIP II.
- That would include a new beamline with a FFA (fixed field gradient accelerator) for producing a pulsed beam for conversion experiments, and a surface beam for muon decay experiments. Other experimental concepts (e.g. muonium-antimuonium) could also be studied.
- Very much in its infancy, but several people have expressed interest (including colleagues from Europe / Asia).
- Already established close connection with AF05.
- Expect several LOI, will use as basis to organize this effort.

LOS

LOI submitted so far

- RF0-AF0-005 : Letter of Interest for a Muonium Gravity Experimentat Fermilab
- RF0-AF0-007 : Letter of Interest for an Upgraded Low-Energy Muon Facility at Fermilab
- RF5_RF6-006: Letter of Interest: physics potential with MEGII-fwd

LOI expected

- Mu2e
- Mu2e II (overview + sub-systems)
- Next generation mu-> e gamma
- Tau at Belle II
- TauFV (?)
- Tau CLFV at EIC
- Tau CLFV at FCC
- High Intensity muon facility (FFA, compressor ring,…)

Maybe

- CLFV at high energy collider (LHC, FCC)
- CLFV and meson / baryon decays
- Super Tau Charm factory
- Comet
- Theory
- ….