

Status Report of RF2: Strange and light quarks

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2nd Rare and Precision Frontier Topical Convener Meeting
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1. Letter of interest requests

- Experiments that will submit a Lol:
 - **NA62/KLEVER** at CERN (Cristina Lazzeroni).
 - **LHCb** (strange group) at CERN (Diego Martinez Santos)
 - **BESIII/SCTF** (CP tests with strange baryons) (Andrzej Kupsc)
 - **REDTOP** at FNAL(Corrado Gatto)
 - **JEF** at JLab (Alexander Somov, Liping Gan)
 - **Pion decay experiments** under consideration (Doug Bryman, British Columbia)
- Experiments contacted:
 - **KOTO** at J-PARC
 - A **kaon experiment at Fermilab?**
 - **PIENU**
 - **Neutron lifetime experiment**

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- Theorists who will submit a Lol:
 1. **Rare decays of mesons (kaons and pions):**
 - Andrzej Buras, Jason Aebischer and Jacky Kumar (TUM, Munich)
 - Giancarlo D'Ambrosio, Luigi Cappiello (Naples), Oscar Cata (Siegen) confirmed on radiative kaon decays
 - Marc Knecht (Marseille) Giancarlo D'Ambrosio and David Greynat (Naples) confirmed on $K \rightarrow \pi l l$.
 - Karol Kampf (Prague) (pion decays) (tbc)
 2. **CP-violation in kaon sector (ϵ'/ϵ , etc.)**
 - Andrzej Buras, Jason Aebischer and Jacky Kumar (TUM, Munich)
 3. **Lepton universality in pion and K decays:**
 - Vincenzo Cirigliano (LANL) (tbc)
 - Andreas Crivellin (PSI) and Martin Hoferichter (Bern)

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4. Rare η and η' decays

- Bastian Kubis (Bonn), Sean Tulin (York)
- Rafel Escribano (Barcelona), Sergi Gonzalez-Solis (Indiana)

5. First-row CKM unitarity tests

- Matt Moulson (Frascati) and Vincenzo Cirigliano (LANL) (tbc)
- Michael Gorshteyn (Mainz U), Chien Yeah Seng (Bonn), Michael Ramsey-Musolf (Amherst): radiative corrections for V_{ud} and V_{us} :
- New Physics: Jorge Camalich (Laguna U., Tenerife), Adam Falkowski (LPT, Orsay) and Martin Gonzalez-Alonso (IFIC, Valencia): mainly new physics in beta decays

6. Lattice QCD

- CPV (ϵ'/ϵ): RBC/UKQCD (Chris Sachrajda et al.)
- Rare strange decays RBC/UKQCD coordinated by Antonin Portelli (Edinburgh)

Many more theorists contacted waiting for their confirmation

2. Schedule for topical group meetings and subconvenors

- Weekly conveners' meeting
- Meetings with individual contributors are arranged as required
- Broader meetings foreseen after the receipt of the Lols

- No sub-convenors appointed: we have a limited number of topics to cover

3. Impact of the European Strategy

- Flavour physics and precision measurement are listed as essential scientific activities on the European strategy update: “A diverse programme that is complementary to the energy frontier is an essential part of the European particle physics Strategy”.

4. Coordination with other WGs:

- RPF6: Dark sector searches represent a significant part of kaon and η decay physics
Separate Lols from NA62, REDTOP, ... on rare decays and hidden sector
- EF6: Hadron Spectroscopy
A common meeting with RPF1, RPF2 and EF6 on June 24 2020

5. Phenomenological models getting probed

- Z' , leptoquarks, SUSY, Charged Higgs
- Searches for new light particles:
 - Vector bosons from new gauge symmetries:
 - Dark photons
 - Hidden photons
 - Leptophobic $U(1)_B$ boson
 - Scalar bosons from extended Higgs sectors
 - Axion-like particles

6. Specific Accelerator Technologies

- We are not currently aware of these, and we have asked the experiments to mention the relevant new accelerator and detector technologies in their Lols.