RF6: Dark Sector Studies at Low Energy

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2nd Rare and Precision Frontier Topical Convener Meeting

June 25 2020

The people/groups/experiments

- Experiments contacted:

LHCb, Belle-II, BES-III, LDMX, M3, NA64, BDX, DarkMESA, Fermini, APEX, mu3e, MAMI-AI, JLab-e+ beams program, MAGIX, DarkQuest, HPS … still planning to do many others.

- Theory community:

Contacted broadly the community (mainly PIs and postdocs);

Advertised the google doc
https://docs.google.com/forms/d/e/1FAIpQLSeLEgcQxYTooyS17LoR06GpZD2tXBu8QG4hQqvPTxSwTIE78w/viewform

(15 responses so far)

Topical group meetings

- Today: first meeting with all subgroup conveners.
- Cross-frontier RF6-EF9-EF10-AF5 workshop July 15-16 11am-1pm EDT. Goal: to discuss benchmarks and other issues.
- RF6 kick-off late July. Precise date TBD.

Subgroups and subconveners

1. Theory: Brian Batell (PITT), Phillip Schuster (SLAC)
2. e+e- experiments: Chris Hearty (UBC)
3. Fixed-target experiments: Natalia Toro (SLAC), Phil Harris (MIT), Gordan Krnjaic (FNAL)
4. Kaon factories: Jure Zupan (Cincinnati) + TBC
5. Low masses @ EF facilities: Phil Ilten (Cincinnati, liaison with EF7-9-10)
6. Neutrino experiments: NF3 convener Pilar Coloma (Valencia, liaising with us)
7. Other opportunities: (not sure what will come in here, so no convener yet)

Impact of the European Strategy

- It seems like the impact is beyond the Snowmass time frame.
- In the context of the "Physics beyond colliders" effort:

- Physics Beyond Colliders study identified many high impact options with modest investment
- Larger scale new facilities such a the Beam Dump Facility, and later LHeC option at CERN, difficult to resource within the CERN budget, considering the other recommendations of this Strategy

a) The quest for dark matter and the exploration of flavour and fundamental symmetries are crucial components of the search for new physics. This search can be done in many ways, for example through precision measurements of flavour physics and electric or magnetic dipole moments, and searches for axions, dark sector candidates and feebly interacting particles. There are many options to address such physics topics including energy-frontier colliders, accelerator and non-accelerator experiments. A diverse programme that is complementary to the energy frontier is an essential part of the European particle physics Strategy. *Experiments in such diverse areas that offer potential high-impact particle physics programmes at laboratories in Europe should be supported, as well as participation in such experiments in other regions of the world.*

Accelerator technologies that are relevant for our Topical Group

- We are already coordinating with AF5 (accelerators for PBC and Rare Processes).