

RF1: Weak decays of b and c quarks

Angelo Di Canto (BNL), Stefan Meinel (U. of Arizona)

2nd Rare and Precision Frontier Topical Convener Meeting

25 June 2020

European Strategy Update

- Strong endorsement of precision flavor physics

1. Major developments from the 2013 Strategy

with continued innovation in experimental techniques. The full physics potential of the LHC and the HL-LHC, including the study of flavour physics and the quark-gluon plasma, should be exploited.

4. Other essential scientific activities for particle physics

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.

Recruitment Activity

- We sent invitation emails with links to our [wiki](#) and a Google Forms [community survey](#) to several collaborations and theorists.
- We made a new list of topics on the wiki page and added information on communication channels and meetings
- Our communication history is documented [here](#)
- Still limited response
 - Responses to the survey: 16
 - RF1 mailing list subscribers: 23
 - RF1 Slack channel members: 34
- We are considering more targeted solicitations with direct invitation of some of the experts listed [here](#)

Community Feedback: Responses to the Survey

Name / collaboration	Topics of interest	Intends to submit:	Possible co-authors
Roy Briere / Belle II, BESIII	charm physics, CP violation		
David Cinabro / Belle II	CP violation in charm and neutrinos	LOI	Belle II
Andreas Crivellin	Flavour BSM, $b \rightarrow sll$, $b \rightarrow c\tau\nu$		
Zoltan Ligeti	pretty much everything	Contributed papers	
Sheldon Stone / LHCb	Weak decays of heavy quarks	LOI and Contrib. papers	US LHCb collaboration
Alexander Lenz	Future theory calculations	LOI and Contrib. papers	TBD
Bryan Fulsom / Belle and Belle II	all B-decay studies		
Dean Robinson	semileptonic B (or charm) decays	LOI	Zoltan Ligeti, Michele Papucci
Alessandro Cerri / ATLAS, CDF, PDG	LFV/LFU in b and t, rare decays		Marcella Bona
Biplab Dey / LHCb, BaBar, CODEX-b	$b \rightarrow s$, semileptonic, spectroscopy		
Gino Isidori	Semi-leptonic B decays (CC and NC)		
Stephane Monteil / CKMfitter / LHCb / FCC-ee	all the physics items of the topical group	LOI and Contrib. papers	FCC-ee Physics and Experiments Design Study
Diego Tonelli / Belle II, HFLAV	Testing BSM dynamics. CP violation.		Mirco Dorigo
Jake Bennett / Belle and Belle II	CP violation in charm decays	LOI and Contrib. papers	
Nibedita Dash / Belle and Belle II	Weak decays of both b and c quarks		
Andreas Kronfeld / USQCD, Fermilab Lattice	Lattice QCD (and other topics)	LOI and Contrib. papers	USQCD

Community Feedback

- In addition
 - Received expression of interests by CEPC community
 - Belle II plans to submit a total of ~6 LOIs, 2 of which are on beauty and charm
 - HFLAV plans to submit a contributed paper (along the lines of what they submitted for the European Strategy update)
- However, the only LOIs received so far is from LHCb (generic cross-frontier/topical group)

Meetings

- Plan to start organizing biweekly 1-2 hour meetings with contributions from the community soon after the frontier kick-off meeting
- Plan to organize a 2-day Topical Group workshop in Oct (?) in preparation for the November Snowmass Planning Meeting
 - The idea is to group people according to physics interest, create a substructure for the topical group and appoint subconveners (who can help organising the workshop and eventually help coordinating future Topical Group activities)
- Participated in June 24 EF6 meeting on hadron spectroscopy
- Considering to contact TF2/5/6/8 for future joint meetings
- We noticed that RF5 plans a meeting on meson/baryon decays on August 13. Can we make this a joint meeting with RF1 and RF2?

Questions

- In Peter's "Experiments Matrix" spreadsheet, what should the first column refer to? Experimental apparatus, measurements, broad physics topics?
- Is the Frontier kick-off meeting the same as the Town Hall?
- What is the goal of the Frontier kick-off meeting? What preparatory work is expected from the topical groups?
- What other Frontier meetings are planned after the initial meeting?