

INTENSITY

frontier

GDR-InF

Groupement de Recherche
Intensity Frontier

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The Intensity Frontier

Probe NP pushing the experiment's luminosity rather than the energy scale.

Strategies

- 1) Look for deviations in measurements of SM processes from theory predictions
- 2) Search for hugely suppressed or forbidden processes in SM

=> require high intensity



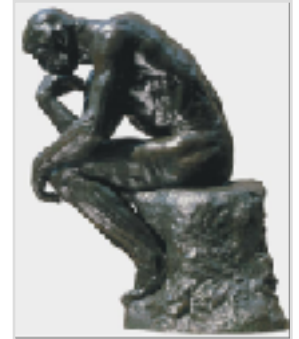
“Symmetry” (08/01/2008)

The Intensity Frontier in France

Lots of activities in the field in France

Theory:

- lattice QCD, effective field theories, sum rules calculations
- Beyond the SM model building and phenomenology
- Fitting tools (CKMFitter, UFit,...)



Experiments:

- Past: CPLEAR, NA48, BaBar... (certainly not exhaustive)
- Present: LHCb, nEDM@PSI, ...
- Future: Belle2, COMET, SHIP... (at different levels)



Always keeping an eye on:

- the rest of the national and international community
- other experiments in the planning or running phases: NA62, MEG, FCC,

Why a GDR?

Theory and experiment need to come together in order to interpret results, combine bounds from different searches

Goals:

- Reinforce relations between **theory and experiment**
- Facilitate **collaborations between labs**
- Favour the emergence of **common projects**
- Provide **visibility** for the French intensity frontier community
- Promote the **young generation** of physicists working in the field
- Discuss the **future experiments probing the intensity frontier**

The GDR-InF Community

- GDR-InF created on January 2017
- 61 senior physicists
- 14 laboratories of IN2P3, INP, CEA
- Many students and postdocs
- New members welcome!

Allocated budget:
15000 euros per year

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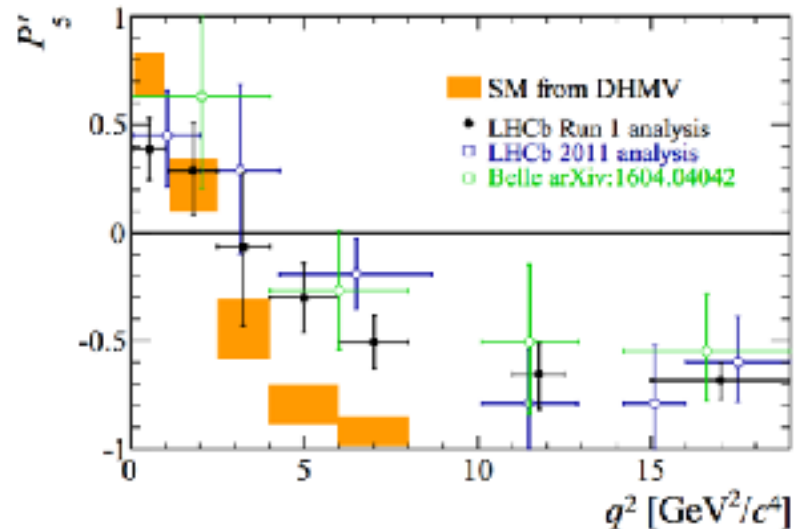
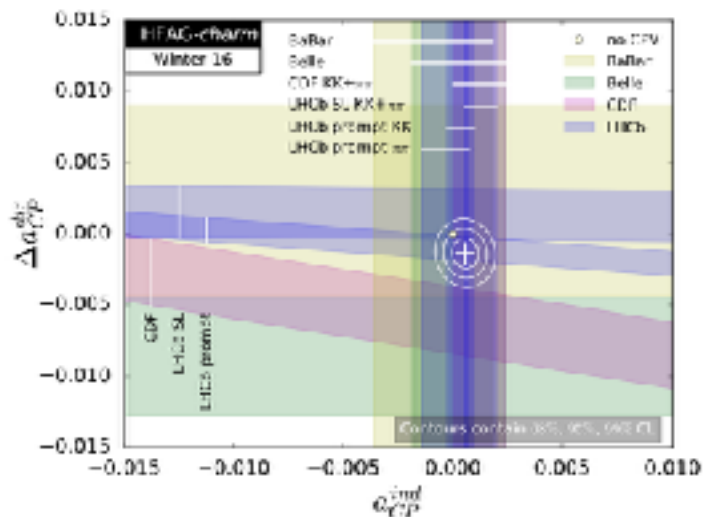
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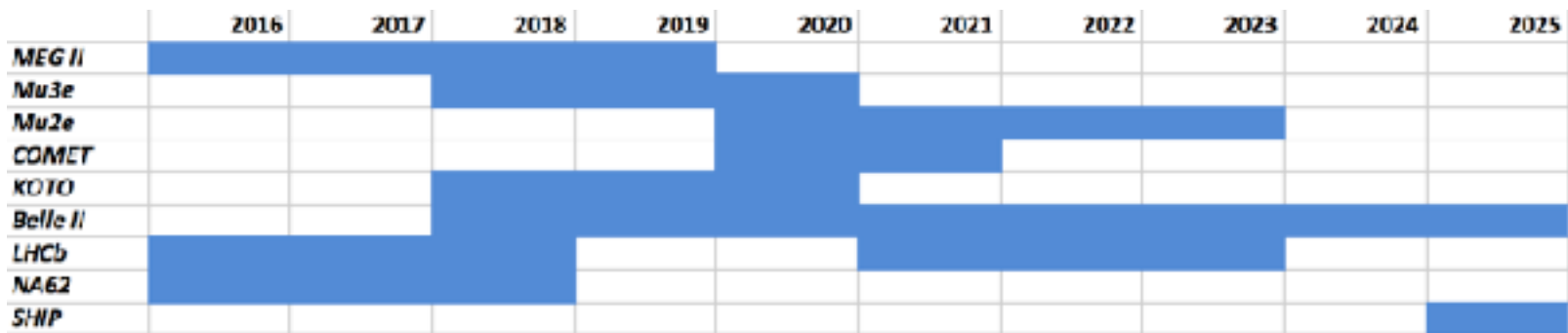
Working Groups

- CP violation:** (Convenors: **Christopher Smith**, **Jean-Francois Marchand**, **Stephanie Rocca**)
 Since the B-factories, CP violation in the quark sector has also been proven to be a precise test of the SM, through the measurement of the parameters of the CKM matrix. This measurement has room for improvement, and LHCb and Belle II will provide further insight on it, as well as additional tests involving the Bs meson and b baryons.
- Rare, radiative and semi-leptonic B decays; Charm and Kaon Physics:** (Convenors: **Yasmine Amhis**, **Diego Guadagnoli**)
 Generally mediated by loops, rare decays are powerful probe of NP. LHCb finds exciting hints of deviations from the SM; certainly deserves to be further analysed and deeply understood. Given the present experimental opportunities, a renewed interest in Kaon and charmed meson decays is emerging, as they provide complementary ways to search for NP effects. Although for the charm physics there is already a large production of data, for the kaons some experimental challenges need to be faced and additional theoretical observables are being proposed.



Working Groups

- **Heavy flavour production and spectroscopy:** (Convenors: **Matthew Charles**, **Emi Kou**)
Ideal framework to test QCD predictions and provides crucial inputs for other measurements e.g. BSM searches. Recently revealed quarks can form more complex structures than previously believed, i.e. tetraquarks and pentaquarks
- **Interplay of quark and lepton flavour:** (Convenors: **Ana Teixeira**, **Justine Serrano**)
Flavour violation in charged lepton sector clear sign of NP, many experiments directly searching for it. Some of most interesting hints for NP observed in lepton flavour universality tests in B meson decays, an approach involving both quark and lepton sectors is mandatory
- **Future experiments:** (Convenors: **Mark Goodsell**, **Stephane Monteil**) Beneficial to discuss future of our field, now when future upgrades of the LHCb experiment as well as new experiments being proposed. The GDR could help in identifying the priorities for French involvement in order to continue to play an active role



Conseil de groupement

- Stephanie Roccia (CSNSM)
- Olivier Leroy (CPPM)
- Olivier Deschamps (LPC)
- Nazila Mahmoudi (CRAL)
- Stephane Lavignac (IPhT, CEA)
- Isabelle Ripp-Baudot (IPHC)
- Stephane T'Jampens (LAPP)
- Diego Guadagnoli (LAPTh)
- Marie-Helene Schune (LAL)
- Christopher Smith (LPSC)
- Sebastien Descotes-Genon (LPT)
- Mark Goodsell (LPTHE)
- Jérôme Charles (CPT)



How it works

Meetings:

- A general workshop each year
- Annual lecture series: From theory to experiment and everything in between
- Smaller (cross-)working group meetings
- Purpose: brainstorming, knowledge exchange, concrete work together
- Format: any useful (talks, round table, bootcamps, hackathons ...)

Mailing list to diffuse information concerning the field (news, workshops, job opportunities...): GDR-INTENSITYFRONTIER-L@LISTSERV.IN2P3.FR

Please invite your students/postdocs to sign up!

Web site: <http://gdrintensityfrontier.in2p3.fr/>

Other ideas?



Latest News!

2017

- GDR-InF Kickoff meeting, Institut Henri Poincaré, March 29-31
- The 2nd LHCb open semitauonic workshop on Nov 13 and 14 at LAL
- Journée SHiP/Physique du secteur caché, October 11
- GDR-Intensity lectures: from theory to experiments and everything in between, "LF(U)V in B decays" will be held in Paris from the 26th to 27th October

2018

- Mini-workshop on charmless B decays
- Future experiments (CERN, January)
- Event in common with GDR neutrino: March
- Baryonic decays workshop
- Strong CP violation workshop: April/May, Grenoble