

BSM Discussion

SUSY Cosmic Inflation
or when cosmology meets particle physics

Many thanks to all the contributors!

Porteur: G. Moultaqa^d

on behalf of: Laurent Duflot^b, Sophie Henrot-Versillé^b, Nikola Makovec^b, Ludovic Montier^c, Baptiste Mot^c, Matthieu Tristam^b, Vincent Vennin^a, and Dirk Zerwas^b

^aAPC
^bLAL
^cIRAP
^dL2C

Phénoménologie des recherches de Nouvelle Physique
aux collisionneurs

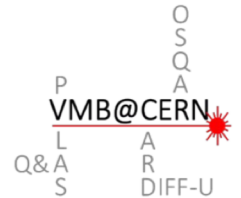
A. Arbey, G. Cacciapaglia, A. Deandrea, F. Mahmoudi

*Univ Lyon, Univ Claude Bernard Lyon 1, CNRS/IN2P3, Institut de Physique des 2 Infinis de Lyon,
F-69622 Villeurbanne, France*

Precision Tests of Fundamental Interactions: Probing General Relativity with Antimatter

Submitted by: D. Lunney (CSNSM-Orsay) and P. Nédélec (IP2I-Lyon)

From OSQAR¹ Experiments at CERN Towards JURA² and VMB@CERN³



Searching for long-lived particles (LLP)

Contact author:

Name: Andreas Goudelis
Institution: LPC
Email: andreas.goudelis@clermont.in2p3.fr

Co-authors:

Jérémy Andrea, IPHC
Geneviève Bélanger, LAPTH
Aoife Bharucha, CPT
Felix Brümmer, LUPM
Éric Chabert, IPHC
Éric Conte, IPHC
Caroline Collard, IPHC
Pierre-Antoine Delsart, LPSC
Benjamin Fuks, LPTHE
Marie-Hélène Genest, LPSC
Vladimir Gligorov, LPNHE
Mark Goodsell, LPTHE
Sabine Kraml, LPSC

Contribution sur la physique du quark top pour les
prospectives IN2P3

Jeremy Andrea¹, Samuel Calvet², Sabine Crépe-Renaudin³, Frédéric Déliot^{*4}, Benjamin Fuks⁵, et Romain Madar²

¹IPHC, Strasbourg

²LPC, Clermont-Ferrand

³LPSC, Grenoble

⁴CEA, Saclay

⁵LPTHE, Paris

pour le groupe top LHC-France

LPNHE scientific perspectives for the
European Strategy for Particle Physics

E. Ben Haim, G. Bernardi, E. Bertholet, J. Bolmont, M. Bomben, N. Busca, G. Calderini, R. Camacho Toro, M. Charles, J. Chauveau, R. Cornat, F. Crescioli, J. Da Rocha, L. D'Eramo, L. Delbuono, F. Derue, R. Gaïor, C. Giganti, V. V. Gligorov, M. Guigue, F. Kapusta, L. Khalil, D. Lacour, B. Laforge, J-P. Lenain, A. Letessier-Selvon, K. Liu, E. Lopez Fune, B. Malaescu, O. Martineau, G. Marchiori, I. Nikolic-Audit, I. Nomidis, J. Ocariz, L. Pascual-Dominguez, F. Polci, P. Privitera, A. Robert, L. Roos, L. Scotto Lavina, A. Tarek

Main author/Contact person

Pierre Pugat (OSQAR spokesperson), LNCMI-EMFL, CNRS, Univ. Grenoble Alpes
pierre.pugat@lncmi.cnrs.fr
Mob. : 06 31 15 40 37

French co-authors

Experiments

Rafik Ballou, Institut Néel, CNRS, Univ. Grenoble Alpes

Thierry Grenet, Institut Néel, CNRS, Univ. Grenoble Alpes

Theory

Jérémie Quevillon, LPSC-IN2P3, Univ. Grenoble Alpes, CNRS

Christopher Smith, LPSC-IN2P3, Univ. Grenoble Alpes, CNRS

Philippe Brax, Institut de Physique Théorique, Univ. Paris-Saclay, CEA, CNRS

- **Prospectives for direct experimental searches in France (*most certainly not exhaustive - please speak up*):**
 - SUSY (LHC + HL-LHC): interest in stop (including long-lived (R-hadrons)) *Interest in SUSY EW searches?*
 - Search for top-philic resonances or rare processes like 4 top (LHC + HL-LHC)
 - *Continue to probe eg simplified models to go down in couplings with more stats (HL-LHC)*
 - *Compressed spectra: LHC searches based on soft objects (->triggers), LLPs, MET*
 - *Plans for LHC Run-3 'standard' searches? New triggers / trigger-level analyses? Performance work?*
 - Dark sectors with possible DM connections
 - dark QCD sector (prompt and LLP signatures) @ LHC/HL-LHC
 - LLP from dark photons, HNL, ... (CODEX-b, SHIP - *personpower in France? Others like eg MATHUSLA?*)
 - Dark Energy connection: chameleons with OSQAR-CHASE
 - Axion/ALP (OSQAR/JURA), *complementarity with haloscopes? Higher-mass LHC searches interesting?*
 - Difference between matter/antimatter gravitational interaction (AEgIS, GBAR)
 - Not directly accessible at the LHC
 - future colliders (FCC-hh for higher masses or ee for extensions only coupling to EW sector)
- **Prospectives for BSM theory related to direct searches in France (*again, speak up*):**
 - Model construction and studies linked to compositeness, LLPs, DM (eg. SUSY, FIMPs, simplified models...)
 - Parameter space exploration through scans
 - Tool development: SuSpect, SFitter, micrOMEGAs, sModelS, MadAnalysis5,...
 - Reinterpretation (tools (see above), how to do for LLPs, recommendations, ...)
 - links between these direct searches, the indirect ones / precision measurements, and astro/cosmo
 - *Proper fora in place in France to discuss at the frontier of theory / experiment / astro/cosmo? (eg GDR/IRN...) Or more international setting? (eg LHC DM WG)*