The IRN-Terascale and the Dark Universe Working Group present the

Groupement de Priorités Scientifiques (GPS) on Dark Matter

Coordinators

Julien Billard (IPNL)
Andreas Goudelis (LPTHE)
Kallia Petraki (LPTHE)
Vincent Poireau (LAPP)

Direction

Marco Cirelli (LPTHE), Emmanuel Moulin (IRFU/DPhP)

Marseille, 15 December 2017

Past and present

- Circa 1998, GPS and the good old times …
  Review article on R-parity violation, hep-ph/9810232.

- Round table, 2017: a space for informal discussions and exchange of ideas that can foment new collaborations

  In Montpellier: Seven colleagues presented a topic of their choice and a discussion followed.

- Dark Matter GPS today: Task force of theorists and experimentalists, within the Dark Universe working group.

  In Marseille: Kick-off meeting, concretise topics (inspired by Montpellier discussion, but also very open to new ideas), start to form working teams.

Table ronde in Montpellier

- Recasting of direct detection results, to facilitate their use in a wider context [Bradley Kavanagh]
- Direct detection of low-mass DM: Motivation, benchmark scenarios, development of new technologies [Julien Billard]
- Cosmological production of low-mass DM via freeze-in [Geneviève Bélanger]
- Searches at the LHC: Simplified models, new signatures, comparison with DD & ID [Marc Besançon]
- Indirect searches with sub-GeV gamma rays: Models, low-energy cosmic-ray propagation, astrophysical backgrounds [Francesca Calore]
- Indirect searches: The role of substructure [Julien Lavalle]
- Indirect searches at high energies: multi-TeV – PeV models, non-thermal DM production and associated signals [Emmanuel Moulin]

Suggested topics for Marseille meeting

Probing the lows and the highs

- Direct detection

  Dark bremsstrahlung in DM-nucleon scattering as a probe of light mediators

- Indirect detection

  High-energy annihilation signals + low-energy radiation from level transitions of heavy DM: Combined reach of experimental searches

- Collider searches

  Displaced vertices from metastable mediators: experimental setups, relation to freeze-in models