Table Ronde : "Mise à jour de prospectives GdR QCD 2027-2037"

Round Table

- Matteo CACCIARI, DS "Calcul et Données", INP, CNRS
- Bertrand GEORGEOT, DAS Physique Théorique INP, CNRS
- Marcella GRASSO, DAS Physique Nucléaire IN2P3, CNRS
- Hervé MOUTARDE, chef du DPhN, IRFU, CEA
- Stefano Matthias PANEBIANCO, Chargé de mission Grandes Infrastructures de Recherche, SSRI, DGRI, MESRE

The GdR QCD in few words and numbers

- Two Science Drivers (SD) of the 12 SD of the IN2P3 : Hadron Structure & Hadronic Phase Diagram. Close to 6 other SD of IN2P3.
- Missions : Training, Interdisciplinarity, Prospects for the Future, International Network, Excellence
- 5 WG (11 convenors : Convenor Committee)
- 16 laboratories (20 proxies in the teams : Proxy Committee)
- 141 (100 cnrs+cea + 31 university +10 emerita) permanent staff, 46 (33 + 13 abroad) post-docs, 42 PhD students

See GdR QCD presentation talk by Audrey in SAN FRANCISCO on Wednesday am

Keywords of the GdR QCD

Comments on this keywo-
list are welcome!
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- WP1 Nucleon & Hadrons: Nucleon structure, Parton distribution functions (PDF & nPDF) (PDF et nPDF), Transverse Momentum Distribution(TMD). Partons Generalized Distribution (GPD), Gravitational Form Factor (GFF), gluon saturation, nucleon spin, …
- WP2 Hadronic Collisions: Initial stages, MonteCarlo Generators, soft processes, soft probes, collectiveness behaviour, hydrodynamics, hadron hadron interactions, …
- WP3 Precision QCD & Hard Probes: Perturbative QCD calculations, precisions, jets, electroweak bosons, heavy flavours, Color Glass Condensate, interaction with QCD matter, ...
- WP4 Non perturbative QCD and QCD models: lattice QCD calculations, Dyson-Schwinger equations, Bethe-Salpeter, exotic hadrons ...
- WP5 Innovant methods for calculations and reconstruction: numerical methods, software development, parallel computing, GPU architecture programming, FPGA programming, Machine Learning, Deep neuronal networks, transformers, quantum algorithms, quantum computing, …

One of the GdR QCD tasks :

One of the tasks entrusted to the QCD Research Group is to organize discussions on the future of our field.

The GdR QCD already undertook in 2024 the process of updating its prospectives for LHC Run5 and beyond, including FCCee, within the context of the French contribution to the update of the European Strategy in Particle Physics (ESPPU 2025).

New Prospective Exercice

The French roadmap "**feuille de route des infrastructures**" will be published end 2026.

Inputs from the French GdR QCD Community are needed : What is our community's scientific **stance** on this new roadmap? What **drives** our community? What is the **physics** would like to do during the next decade?

Our **input as a community is crucial** for two reasons: It will enable our governing bodies **to advocate for our science to funding agencies**, and it will contribute them to **take the most suitable decisions to arbitrate the available** human and financial resources.

Some Guidelines

We will need to give greater visibility to the **younger generation**, who will ultimately take on the responsibility of carrying out our prospectives.

In addition, we believe we must be **pedagogical**, with a scientific narrative that is engaging and understandable to scientists outside our field.

We believe that the implication of the **QCD theory colleagues** is of outstanding importance is doing this exercise in collaboration with the experimental colleagues.

Finally, we also think that an **executive summary** of our discussions is mandatory to help our governing bodies

To be discussed today

We would like to **discuss about the process** that we have to put in place in order to address this ambitious goal of discussing the physics we plan to do during the next 10 years, to edit a document summarizing it, accompanied by an executive summary of the GdR QCD community.

Our proposal

- **Call for inputs** of the community: theory & experiment.
- Detector inputs in close connection with other physics inputs will be appreciated.
- Define a **template for the inputs** of the community: physics motivations, participants, link with a detector project. Alignment between resources and physics or detector objective (the size of our community may not increase by a big factor in the next decade)
- Organisation of a **"downtown"** meeting where all the inputs will be presented. Before April 2027
- Organise a day **meeting of the conveners** and management team to work on a summary. By June-July 2027
- Edition of a **document** GdR QCD prospectives 2027-2037, including an **executive summary** by the end of 2027

It is time for discussion ,,,