Discussion

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The number of community projects

- during last 5 years@France: high-μ_b heavy-ion program not promoted prominently any more
  $\rightarrow$ lack of community support: consensus for the short/midterm timescale
- Today: diverse and complementary research directions
  $\rightarrow$ the answer of the 'right' project is different depending on the interest
  $\rightarrow$ Does not inhibit hard decisions from scientific direction:
  but: not expect from physicists to orient away from their favourite project/research line without need
- No decision is a decision and among the worst decisions
  $\rightarrow$ ineffective use of ressources, loss of opportunities
- Late decisions or little budget/contribution to R&D
  $\rightarrow$ larger costs: often forcing towards non-ideal solutions

The number of community projects

Splits have not produced non-support in France despite more redundancy in physics than for QGP/hadron physics

- ATLAS and CMS Phase 2 upgrades
- long-baseline neutrino: Hyper-K & DUNE

The role of France in hadron/QGP physics

- critical size of the French program in landscape
  $\rightarrow$ no/very little technical contribution: French disengagement
  $\rightarrow$ if wanted, must be an affirmed choice based on physics arguments that need to be discussed
- critical expertise/orientation of the French program in landscape
  $\rightarrow$ France: a unique mix $\rightarrow$ specific internal structure, connections and directions reflected in community with deviations from other communities: if we want other collisions/programs, we must be at the table with a strong technical contribution
  *S*trength of exclusive physics in hadron physics, leadership at interfaces of QGP physics (proton-nucleus program, nuclear physics via hydro)
- Not possible to sustain a large program without dedicated hardware today
  $\rightarrow$ sustained funding support requires technical contributions

Historic funding example: CMS heavy-ion France

- started with an ERC, then ANR and then another ERC:
- no technical contribution, but a large number postdocs & PhD students: attracting/recruiting within full French community
  $\rightarrow$ immense visibility, large success, key and legacy results
- potential largely unexploited
  $\rightarrow$ data taking: lower magnetic field as a unique opportunity for low-p_T quarkonium discussed early on: no public feasibility study, no longer discussed
  $\rightarrow$ measurements: former flagship measurement no longer done with full statistics from Run 2 $\rightarrow$ $\psi(2S)$ yield modification
  $\rightarrow$ human ressources: 1 CNRS position over 15 years, no university position
  $\rightarrow$ 2 persons hired passing via CMS heavy-ion France (no university): one in Dune, one in ATLAS on electroweak physics, hired at late stage of career for French standards

Without a strong technical contribution, it is very difficult (impossible?) to secure ressources and to play a role for strategic decision of the detector/accelerator directly impacting the physics outcome on medium/long time scales

Remarks

- hadron and QGP physics have a strong and diverse physics case now and in the future
  $\rightarrow$ a data-driven field with a lot of room for surprises
  $\rightarrow$ limited by experimental precision or availability of observables so far unaccessible
- France has clear technical projects to address this variety of physics cases with new observables and better precision
- French community plays a key role in a number of important subareas
- French community has a critical mass and key expertise
- French contribution critical at the international level
- Impact of France relies on experimental technical contributions