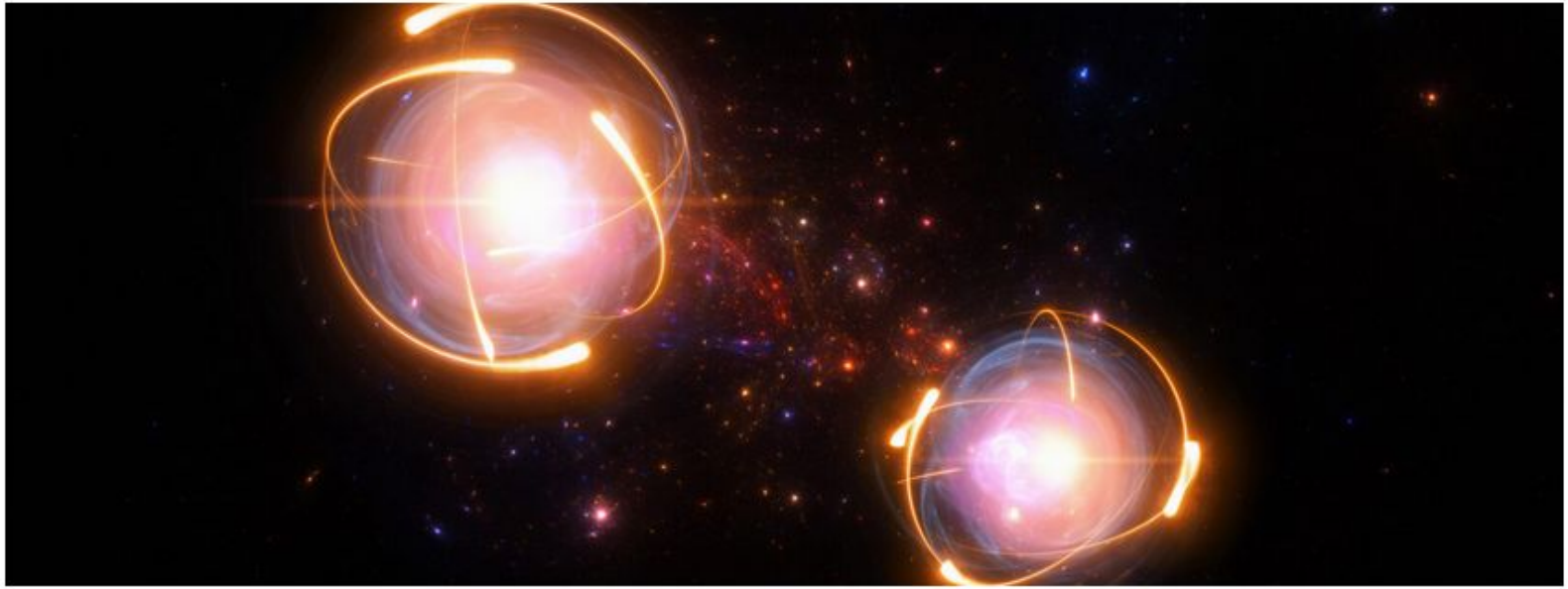
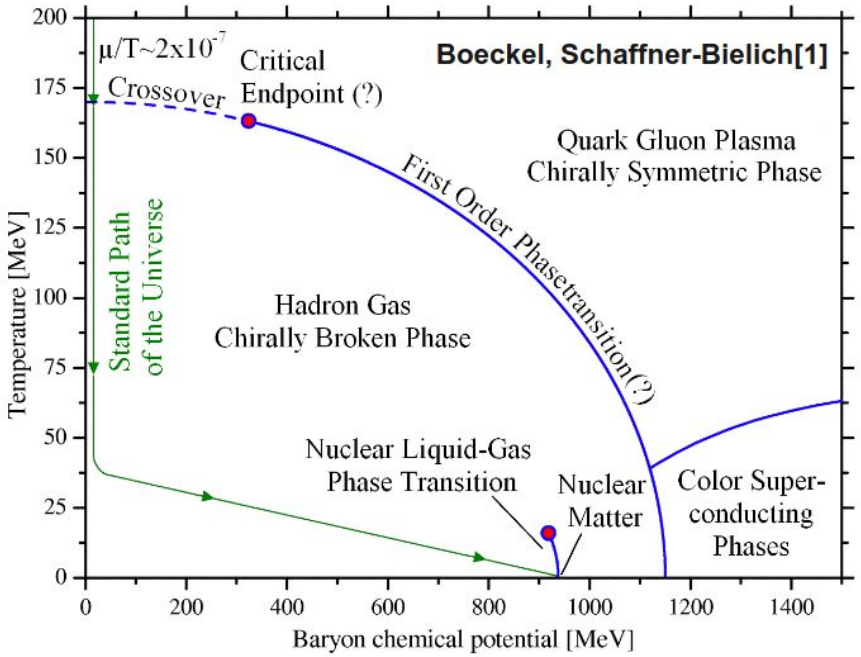
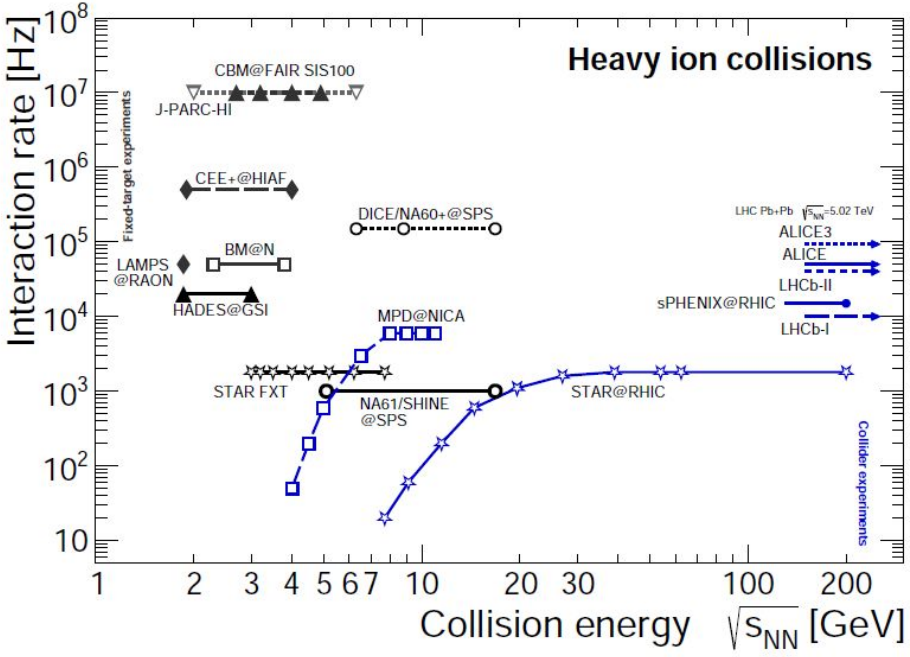
PENETRATING PROBES OF HOT HIGH-MU_B MATTER: THEORY MEETS EXPERIMENT



21 July 2025 — 25 July 2025

Investigating the QCD phase diagram





Chasing the QCD critical point, signals of a 1st order phase transition and characterizing the high-μ_B QGP

New/forthcoming experiments/facilities to open up new observables for the study of the high-μ_B QGP

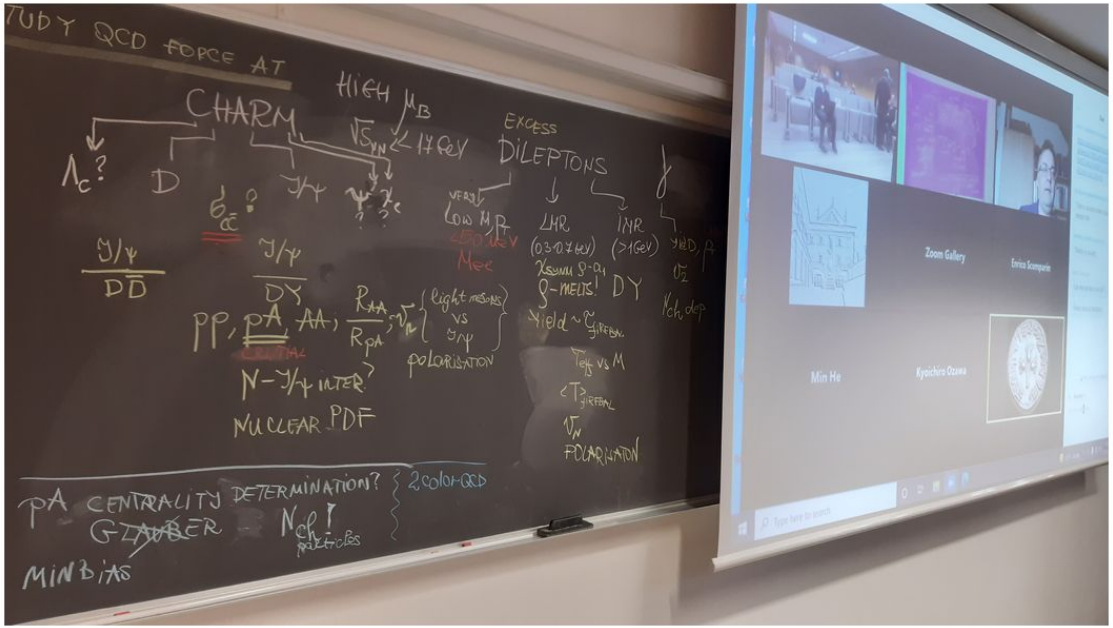
The first episode

EXPLORING HIGH-MUB MATTER WITH RARE PROBES

11 October 2021 — 15 October 2021

Hybrid/Mixed

First workshop to take place (partly) in person at ECT* after the COVID “break”
→ 38 speakers



Several existing or planned facilities (**GSI-SIS18, CERN-SPS, FAIR, NICA, JPARC, RHIC-BESII and fixed target**) will provide collisions in an energy domain, O(10 GeV), extending our knowledge of the phase diagram towards higher densities. We will review the topics that can be studied at these facilities, with the aim of sharpening the corresponding physics programs and to investigate their complementarity.
The emphasis will be on the study of **dileptons, heavy-quark, and quarkonium,** less explored in this energy domain.

Results and highlights

A variety of pertinent facilities will come online (FAIR, NICA, JPARC-HI) in the next 5-10 years or are already operative (SPS), allowing for high reaction rates…

…the field of heavy-ion physics in the collision energy regime of roughly 3-15 GeV enjoys broad interest and support in the QCD matter community,t

So far, very little experimental information exists in this regime, especially for the "rare" probes -- the focus of this meeting -- which have proven extremely informative in the high-energy regime.

…measurements of the spectral shape of the rho-meson and possibly its excited state, the ρ', are expected to give new and improved insights into the mechanisms of chiral restoration

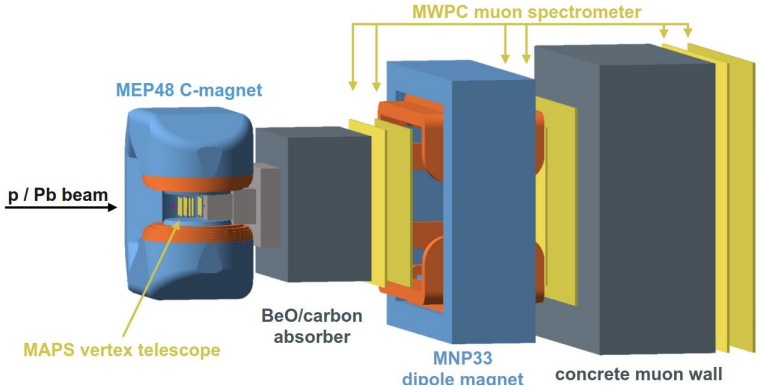
…exciting prospects for precise D and D_s flow measurements (possibly even Λ_c), which are likely to advance our understanding of the heavy-flavor transport coefficient in (baryon-rich) QCD matter,...

Blue-shift free temperature measurements for masses above 1.5 GeV, and true lifetime measurements (possibly sensitive to a first-order transition), through excitation functions, are also compelling objectives…

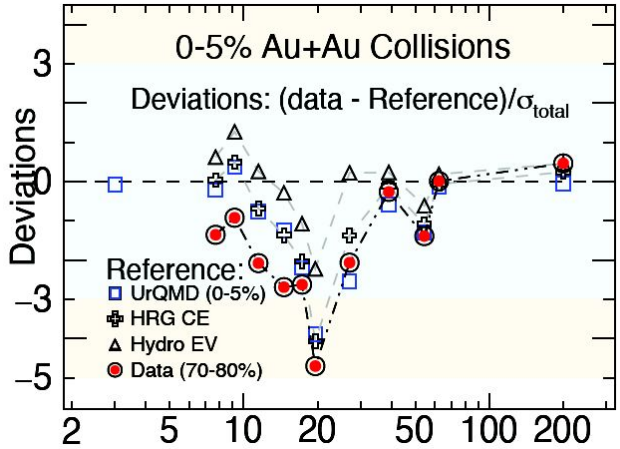
…the J/ψ may not be much affected by the energy densities reached in collision energies below 10 GeV, but its modified yields from the feeddown of higher states remain of substantial interest.

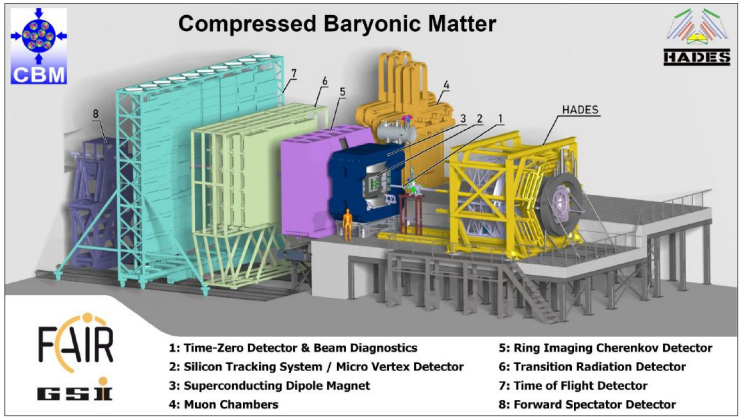
Why having a second workshop ?

New facilities and/or new experiments decisively advancing



New exciting experimental results





FAIR staged realization plan

- 2023: Buildings completed
- 2024: Installation started
- 2025: Start of FAIR commissioning
- 2028: CBM ready for beam

Organization of the week

- Monday
  - Theory introduction on QCD phase diagram
  - Overview of existing and foreseen projects
- Tuesday
  - Open heavy flavours
- Wednesday
  - Quarkonia
- Thursday
  - Dileptons (e.m. probes)
- Friday
  - Concluding discussions
  - Action items

- Morning
  - (mainly) reviews of observable of the day: theory/experiment
- Afternoon
  - Specific talks on models and experimental results

Detailed program at
https://indico.ectstar.eu/event/239/timetable/#all

Structure of discussions and dedicated sessions

- Speakers: please allow at least 10 minutes of your allocated time for discussion/clarification of the content of your talk

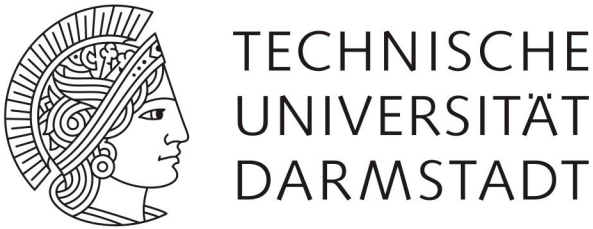
- On day n
  - Morning discussion (typically 9:30-10:30) on the topics of the day n-1
  - Review speakers to drive the discussion (take notes!), organizers will help

- To help next day discussion and to avoid forgetting important questions
  →please use the following doc to mark your questions

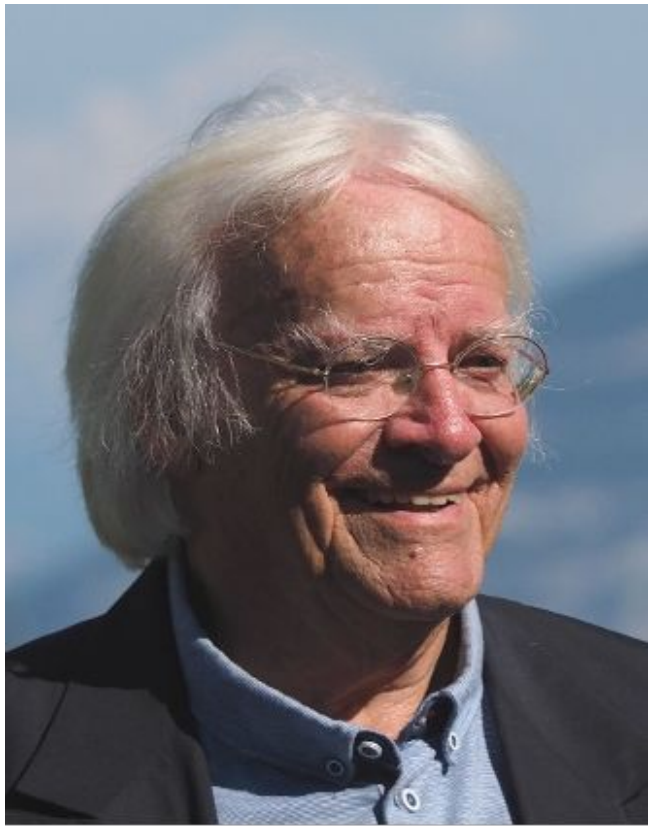
https://docs.google.com/spreadsheets/d/1PmMdTy06clurrJIWbGGBPstxMp_SRuFAbK3-xHSMTn8/edit?usp=sharing

Our sponsors

This workshop was made possible thanks to contributions
from several institutes/universities



Prof. Hans Specht

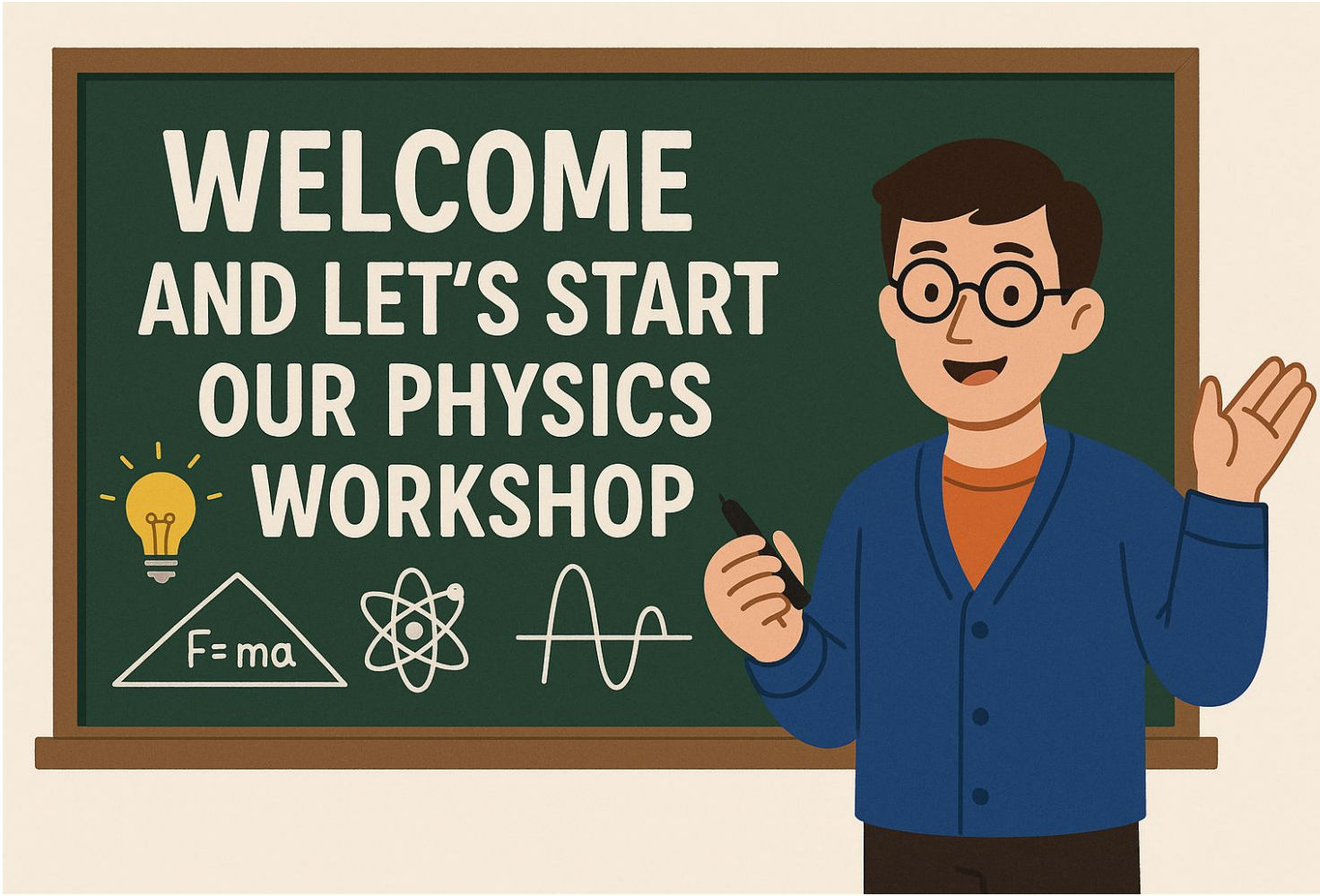


1936 - 2024

A driving force of our field
A mentor for many among us

Check his biography,
just published

https://link.springer.com/book/10.1007/978-3-031-92353-1


WELCOME
AND LET'S START
OUR PHYSICS
WORKSHOP
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