HADES activities
2018-2019

Current members


Alberto Blanco


Paulo Fonte


Luis Lopes

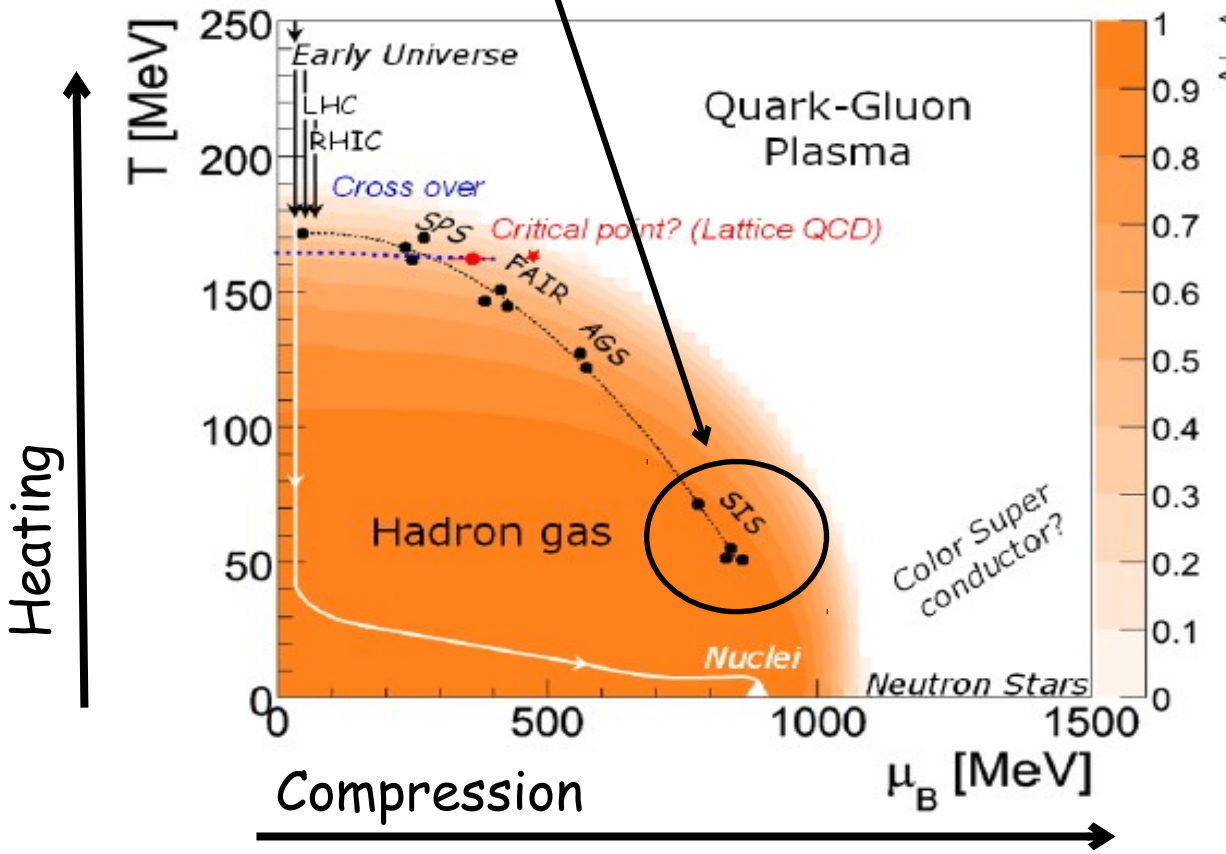

João Saraiva

Luis Pereira and **Celso Franco left the group** at the end of 2018 and 2019 respectively.
MANY THANKS FOR THE CONTRIBUTION!!!!

HADES experiment

Study of "emissivity" and hadron properties in dense and cold nuclear matter, detected via e+ e- pairs (dielectrons) and strange hadrons, produced in proton , pion and heavy ion induced reactions in a 1-3.5 GeV.

Explore this region of the phase-space, still poorly known.



Compressed matter at low T

HADES experiment

Study of "emissivity" and hadron properties in dense and cold nuclear matter, detected via e+ e- pairs (dielectrons) and strange hadrons, produced in proton , pion and heavy ion induced reactions in a 1-3.5 GeV.

Spectrometer with high invariant mass resolution and high rate capability.
Installed at SIS18, GSI, Darmstadt. http://www-hades.gsi.de/

Project launched in late 1994
6 years R&D and construction

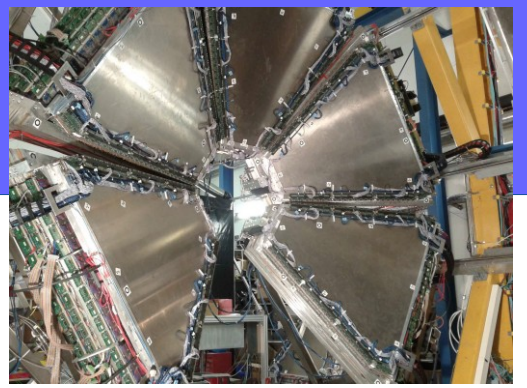
First production run in 2002

International collaboration of 19 institutions from 10 European countries.

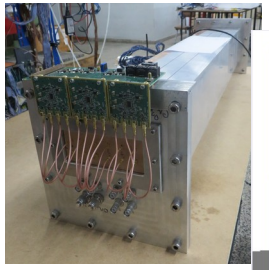
Cyprus, Czech Rep., France, Germany, Italy, Poland, Portugal, Russia, Slovakia, Spain.

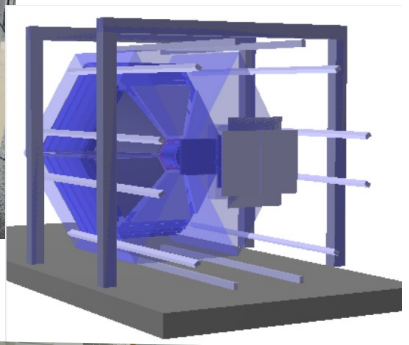
HADES
Lines of work

RPC-TOF-W

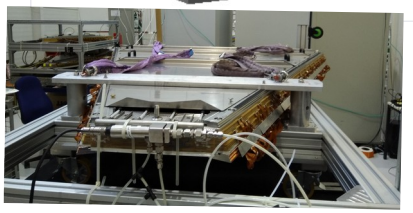


- **RPC-TOF-W.**
  - Maintenance, operation and upgrades





- **Design and construction of the new RPC-TOF-FD**
  - RPC-TOF Forward Detector

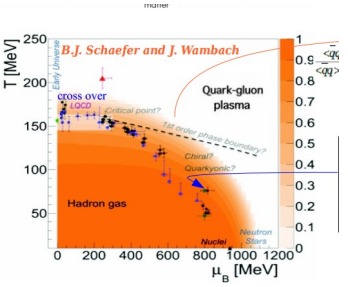


-Collaboration with the HADES tracking group

- Support the MDC group in preparing the HADES tracking system for High-Rate Experiments at SIS100 (FAIR) + Maintenance, operation and upgrades.

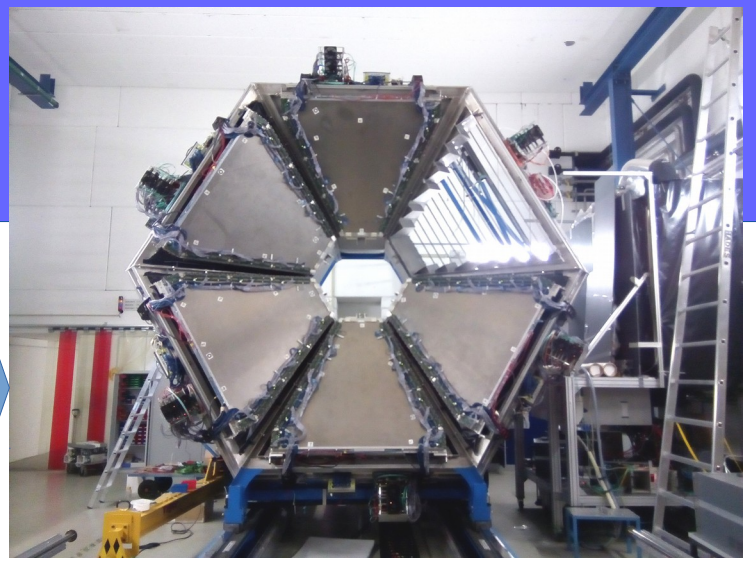
- **Analysis**

-Investigation of hadron properties inside a baryonic-rich medium.

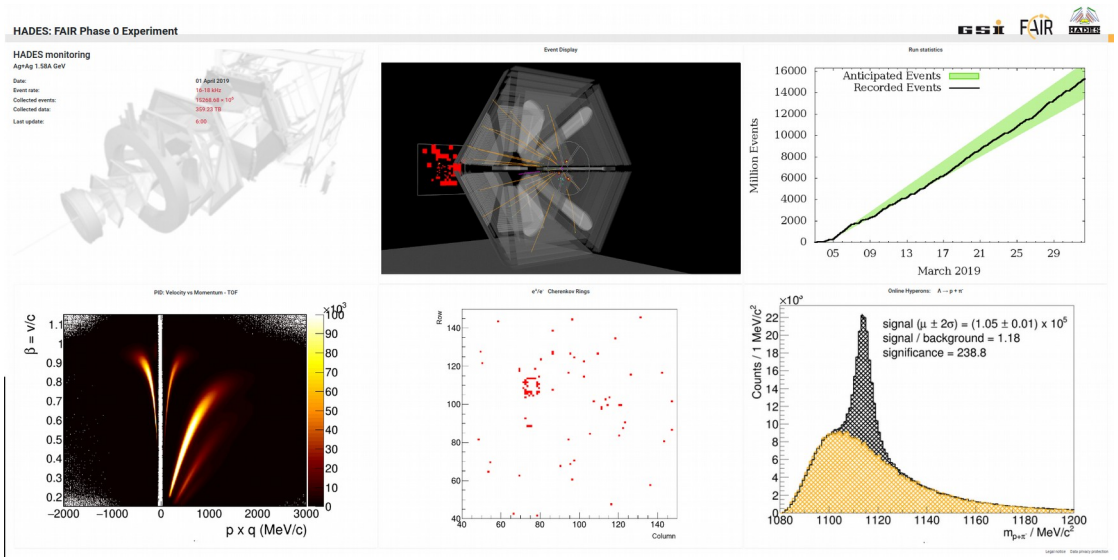


RPC-TOF-W. Maintenance, operation and upgrade.

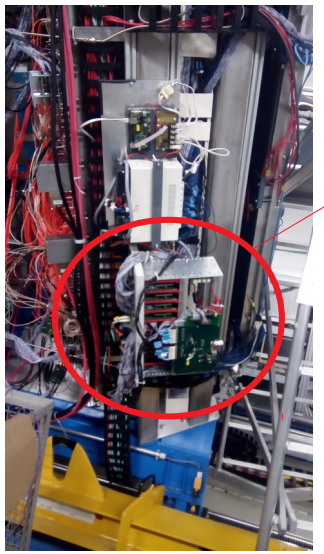
- **Re-instalation of the RPC-TOF-W** (together with all subsystems and cabling). This was done (partially) several times due to the phased installation of the ECAL detector (at the rear of RPC).



- **Successfully data taking early 2019** with Ag+Ag @ 1.75 AGeV.



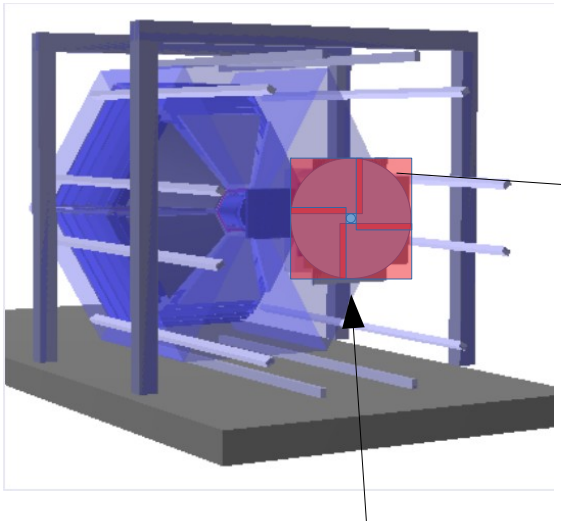
- **Complete RPC DAQ upgrade**, necessary to run HADES-DAQ at 200 kHz trigger rate.



Design and construction of the RPC-TOF-FD

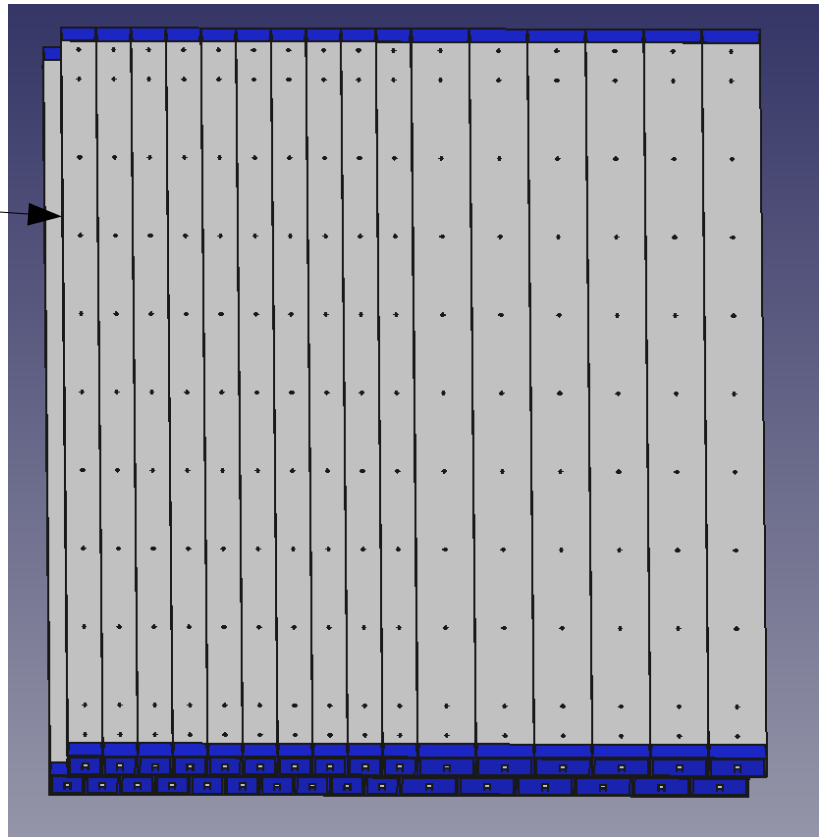
~ **4 m² in the Forward Region** covered with four modules of 32 individually shielded RPCs. Same technology used in TOF-RPC

σt < 100 ps Eff > 90% R < 320 Hz/cm²

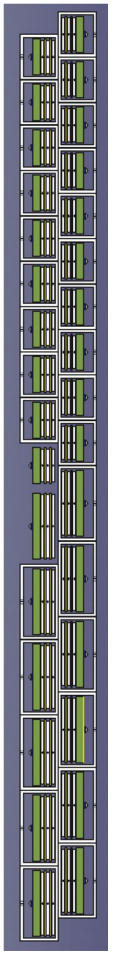


HADES software
RPC-FD implementation

Top view



Lateral view



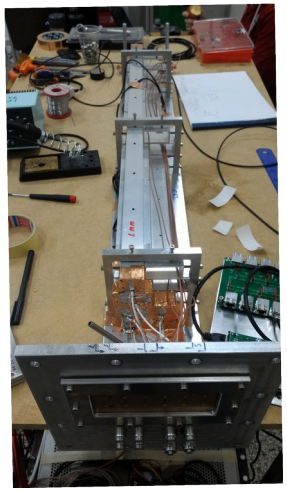
Design and construction of the RPC-TOF-FD.

Beam prototype test at Julich.

THANKS TO CCMC

Setup

Four RPC cells. Two types and two glass (1-2 mm) thickness



RPC + heating system for count rate improvement

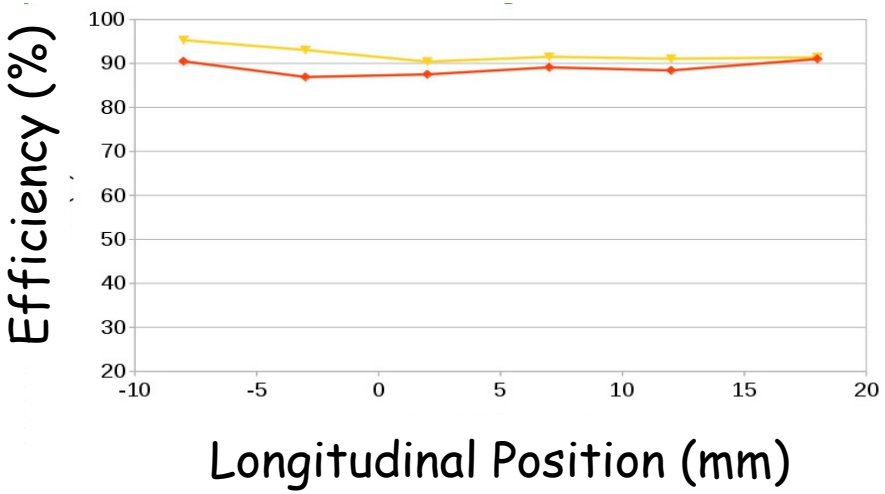
Reference scintillators

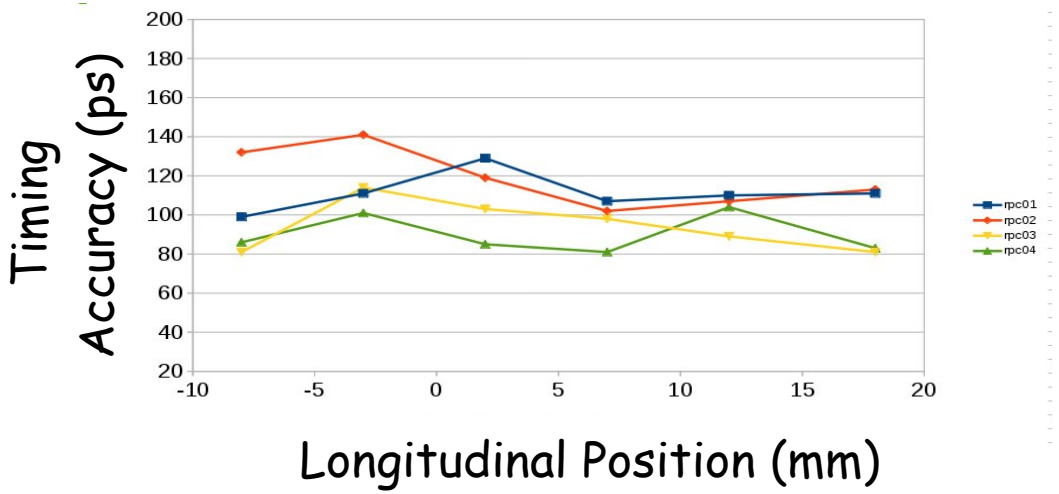
JÜLICH Forschungszentrum

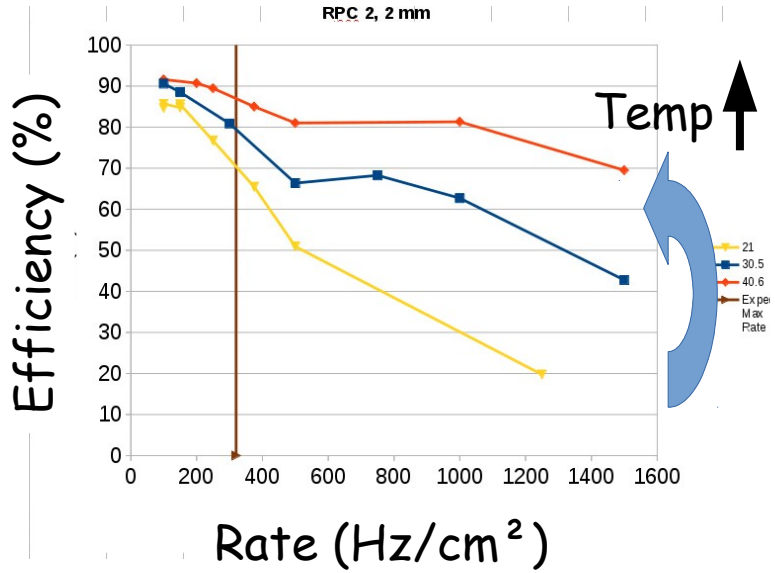
Design and construction of the RPC-TOF-FD

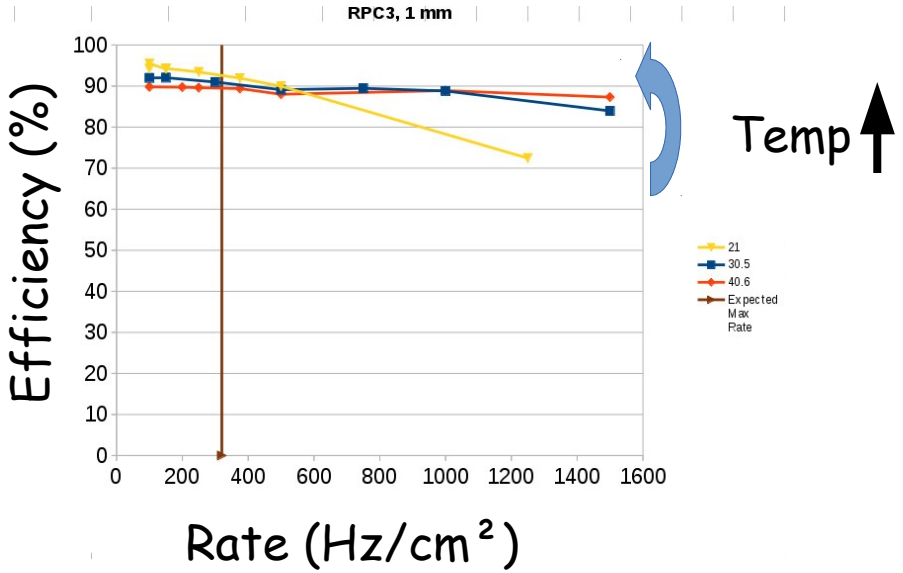
Beam prototype test at Julich.

Requirements fulfilled. Rate capability can be further improved by increasing the operation temperature of the detector



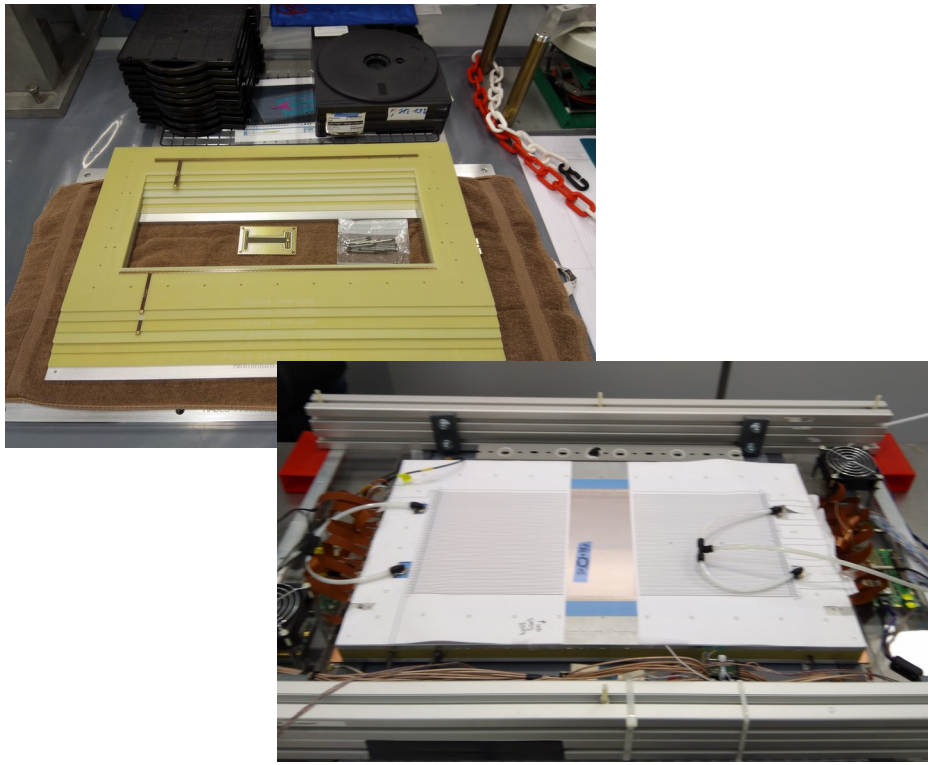




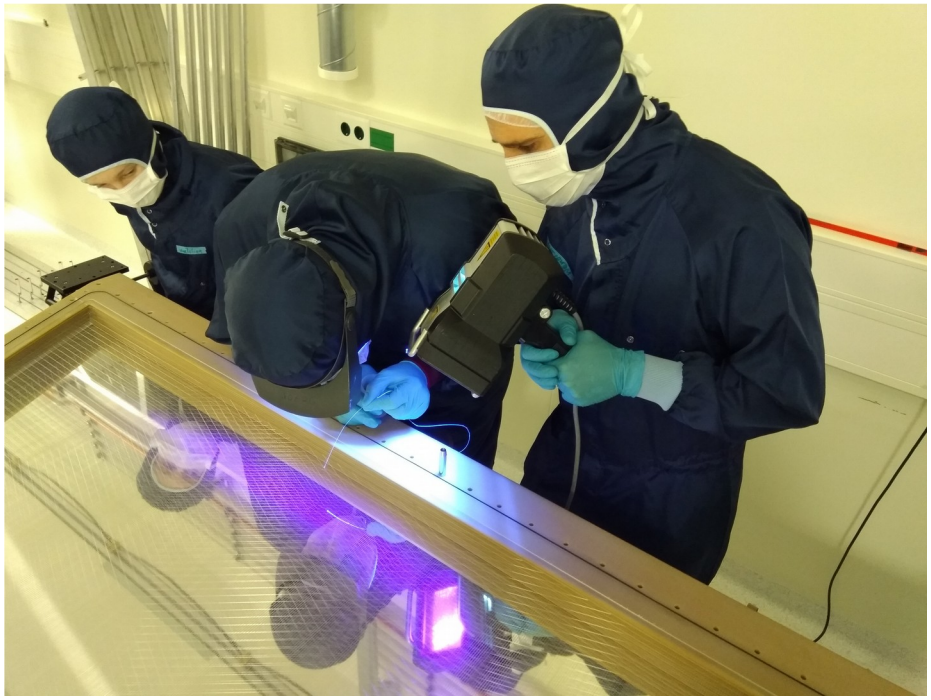


MDC activities

Prototyping new MDC chambers, which explore new configurations for the future upgrade of the tracking system.



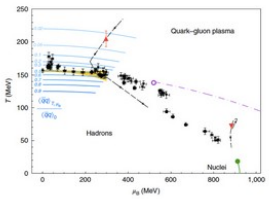
Maintenance and optimization of the current tracking system



Analysis

Present result from **Au + Au @ 1.23 AGeV at Kruger 2018**

Paper **published in NATURE:** Probing dense baryon-rich matter with virtual photons"

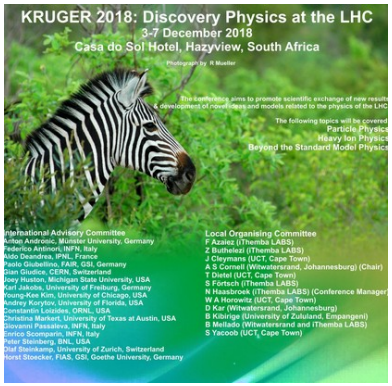


HADES na Nature Physics / 2019-08-12

Noticias LIP

Resultados da experiência HADES com contribuição directa do LIP publicados na revista Nature Physics apresentam a medição das propriedades de um estado de matéria similar ao que resulta da fusão de duas estrelas de neutrões

LER MAIS ›



Article | Published: 29 July 2019

Probing dense baryon-rich matter with virtual photons

The HADES Collaboration

Nature Physics **15**, 1040–1045(2019) | Cite this article

2346 Accesses | **4** Citations | **129** Altmetric | Metrics

Unfortunately this line is not active!!!! How wants to join?

HADES
Near future

- **RPC-TOF-W operation.**
  - **Data taking** with new systems already in FAIR PHASE-0.
  - Complete **upgrade of the DAQ** system of RPC-TOF-W. => Towards 200kHz data taking.

- **Design and construction of the RPC-TOF-FD**
  - Finalize **implementation** of **FD** into the HADES **software.**
  - **Construction and evaluation** of four planes of FD.
  - **Commissioning run at GSI** (mid year).

- **Collaboration with HADES tracking group**
  - Continuation of the **tests** carried out with the **MDC prototype** . **Integration** of the **new electronics** in some of the HADES planes/sectors and subsequent test in June 2020. **Maintenance of the gas systems**.