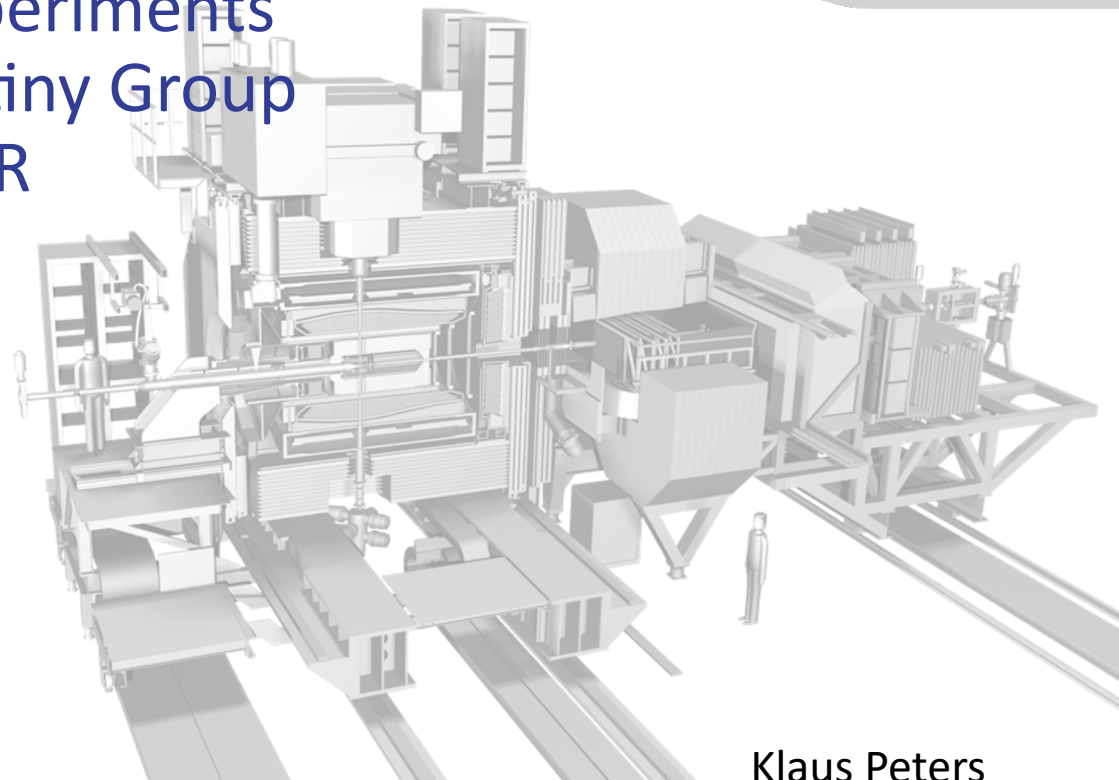


# PANDA Overview

Intro by the Spokesperson

Expert Committee Experiments  
Experiment Cost Scrutiny Group  
(ECE/ECSG) of GSI/FAIR

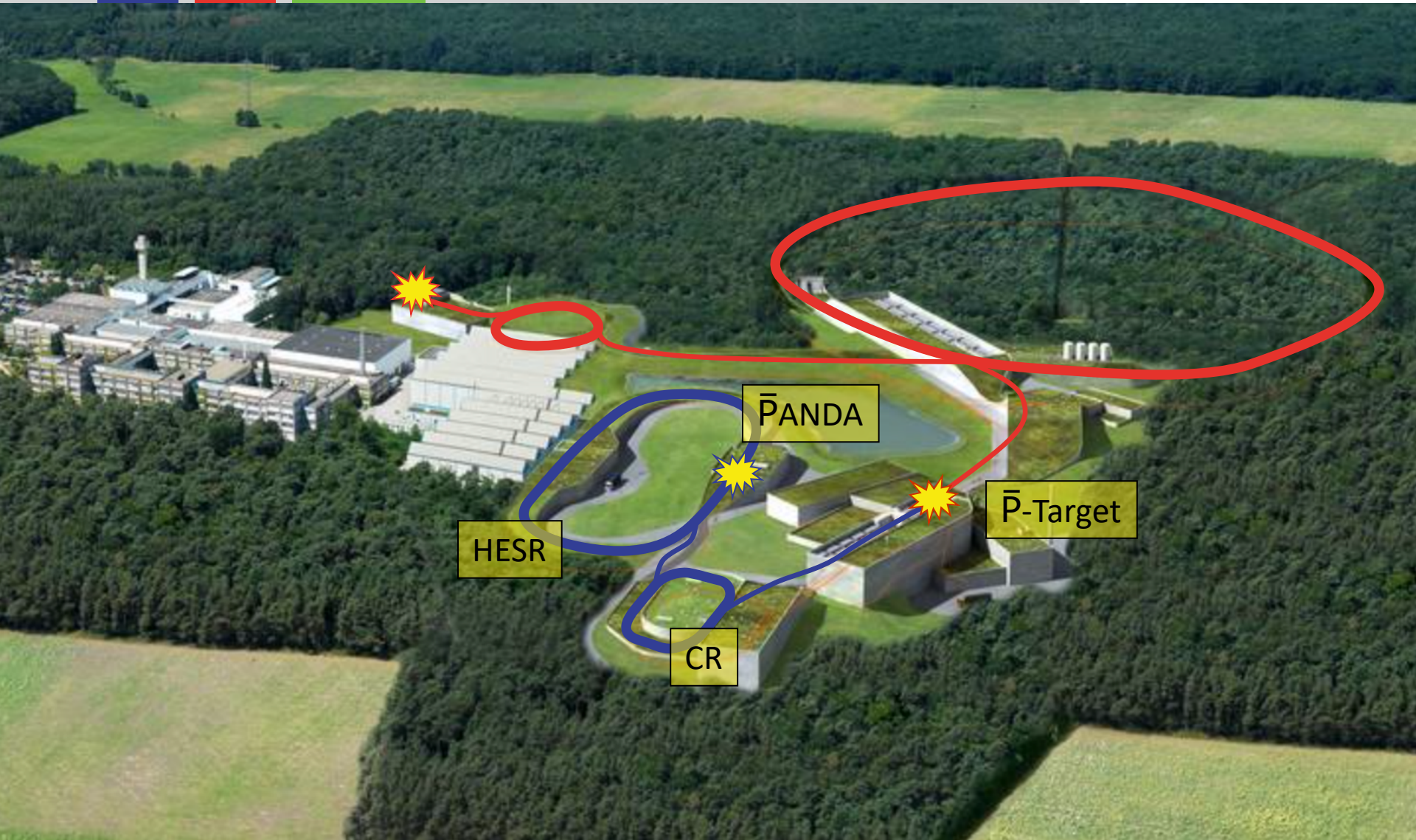
GSI Darmstadt, Oct 27, 2020



Klaus Peters  
GSI/U Frankfurt



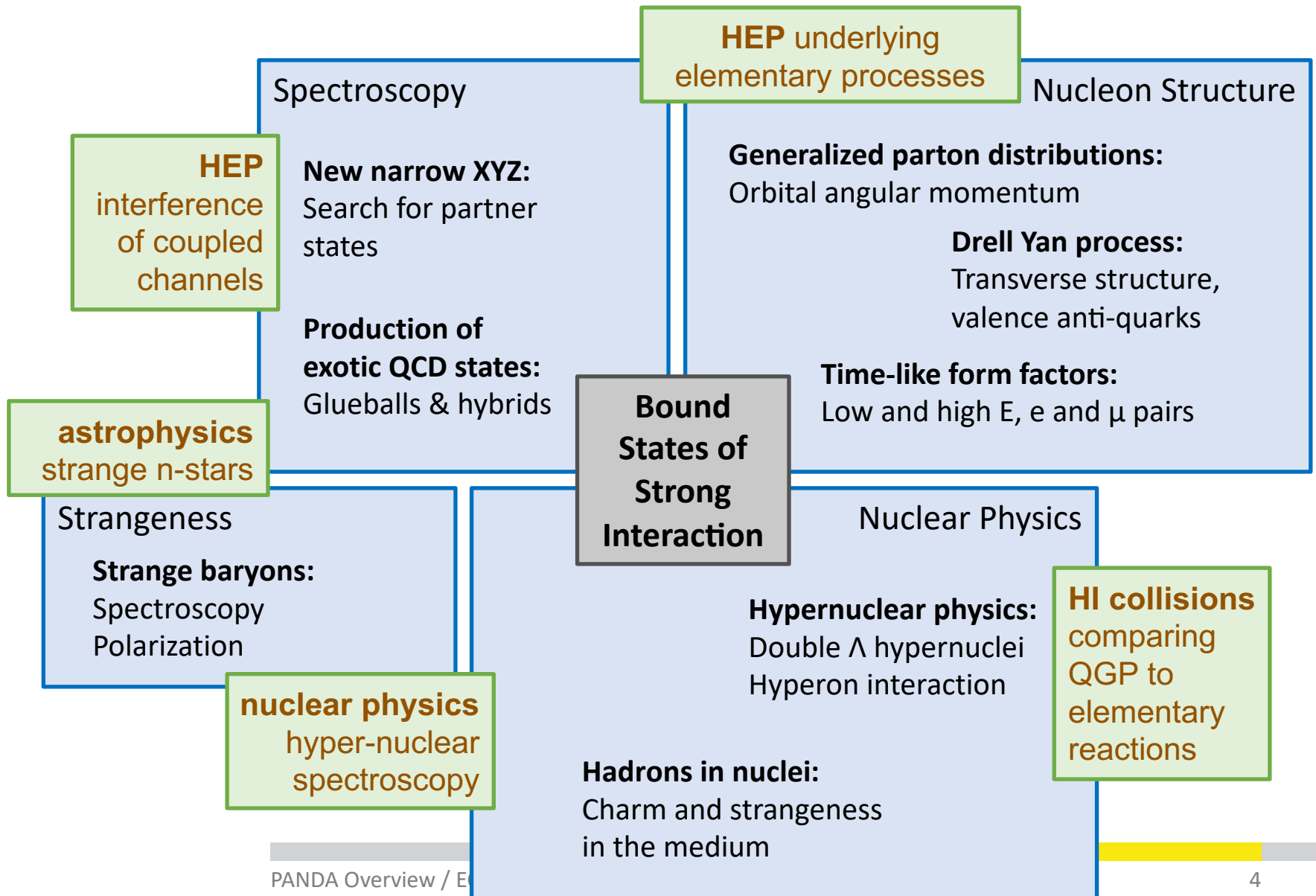
# Antiproton Chain: HESR & PANDA



## Antiproton-Proton Annihilation →

- creation of mass rather than momentum
- very broad mass region from light to charm
- zero net quark content
- gluon-rich environment
- recoil and recoil-free physics

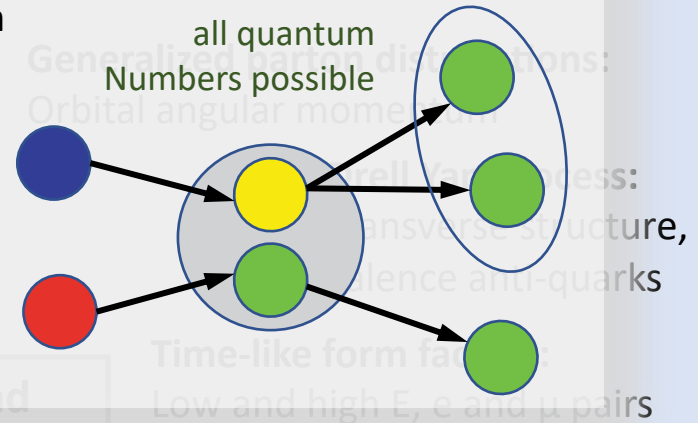
→ **broadest spectrum of hadron physics  
in a single! experiment ever**



## HEP underlying elementary processes

**Production** all exotic and non-exotic quantum numbers accessible with a recoil

- high discovery potential
- associated, access to all quantum numbers (exotic)

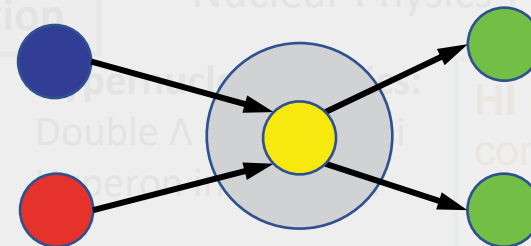


Nucleon Structure

## astrophysics strange n-stars

**Formation** all non-exotic quantum numbers accessible

- not only limited to  $J^{PC} = 1^{-}$  as  $e^+e^-$  colliders
- precision physics of known states
- resonant, high statistics, extremely good precision in mass and width

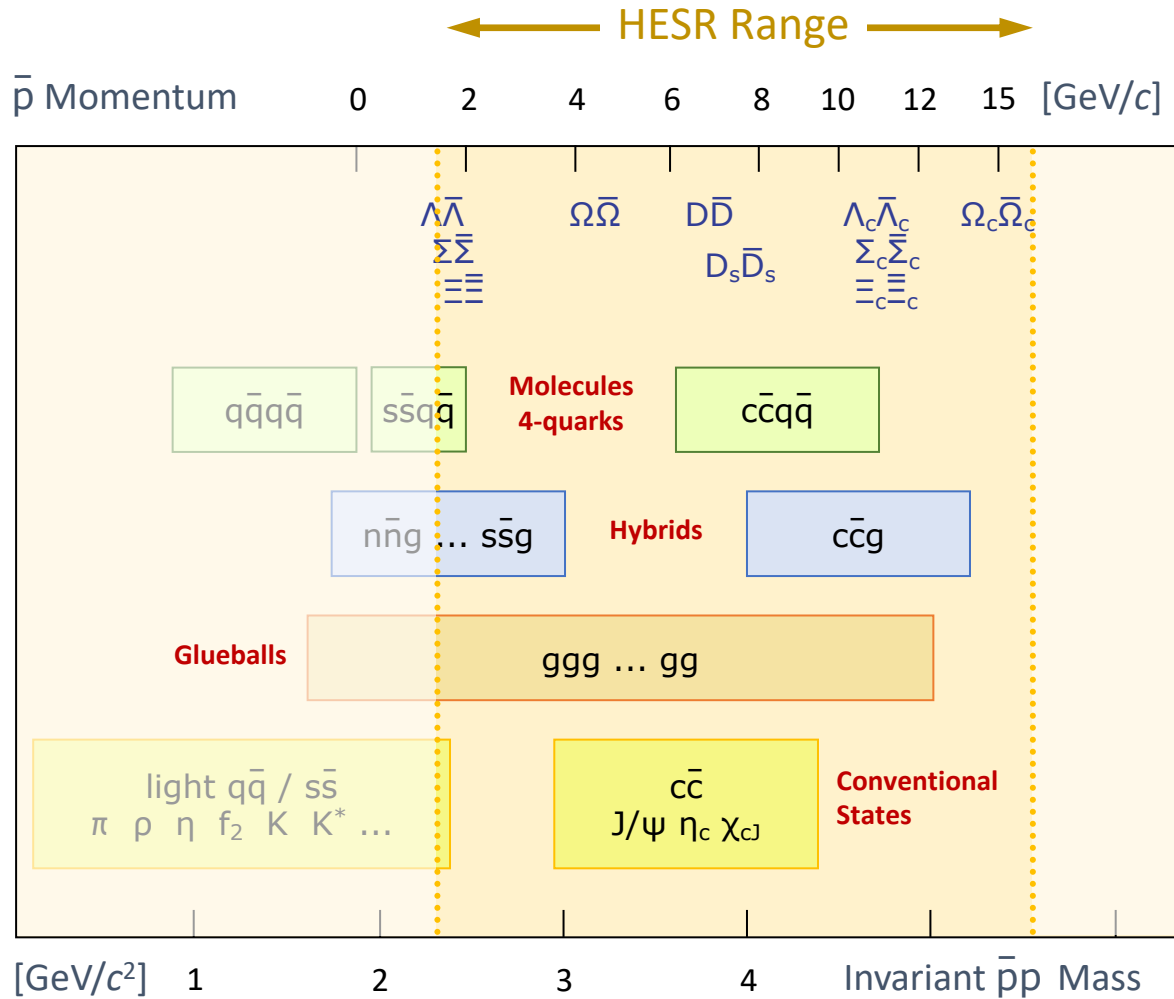


HI collisions

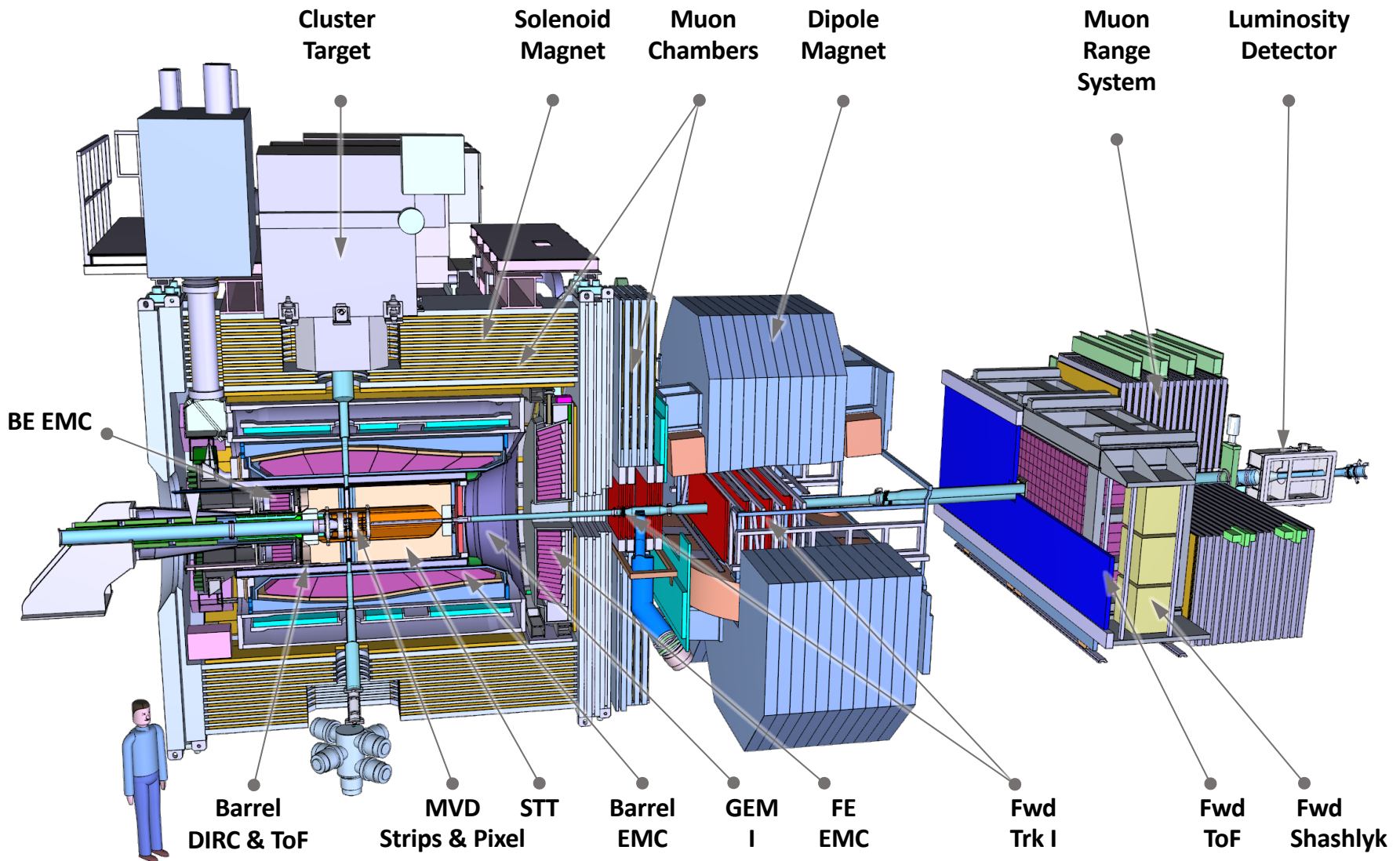
comparing P to elementary reactions

Charm and strangeness in the medium

# Example: Accessible Hadrons at PANDA



# Day-1 Setup



# Status of PANDA TDRs



2008 approved  
**In production**  
**EMC**

2009 approved  
**In production**  
**MAG**

2013 approved  
**In production**

2013 approved  
**In production**

2013 approved  
**In production**

2014 approved  
**application for funds**

2016 approved  
**application for funds**

2017 approved  
**In production**

2017 approved  
**In production**

2018 approved  
**application for funds**

2018 approved  
**application for funds**

2018 approved  
**production and further contracting started**

2019 approved

2019 approved  
**application for funds for 1 Quarter**

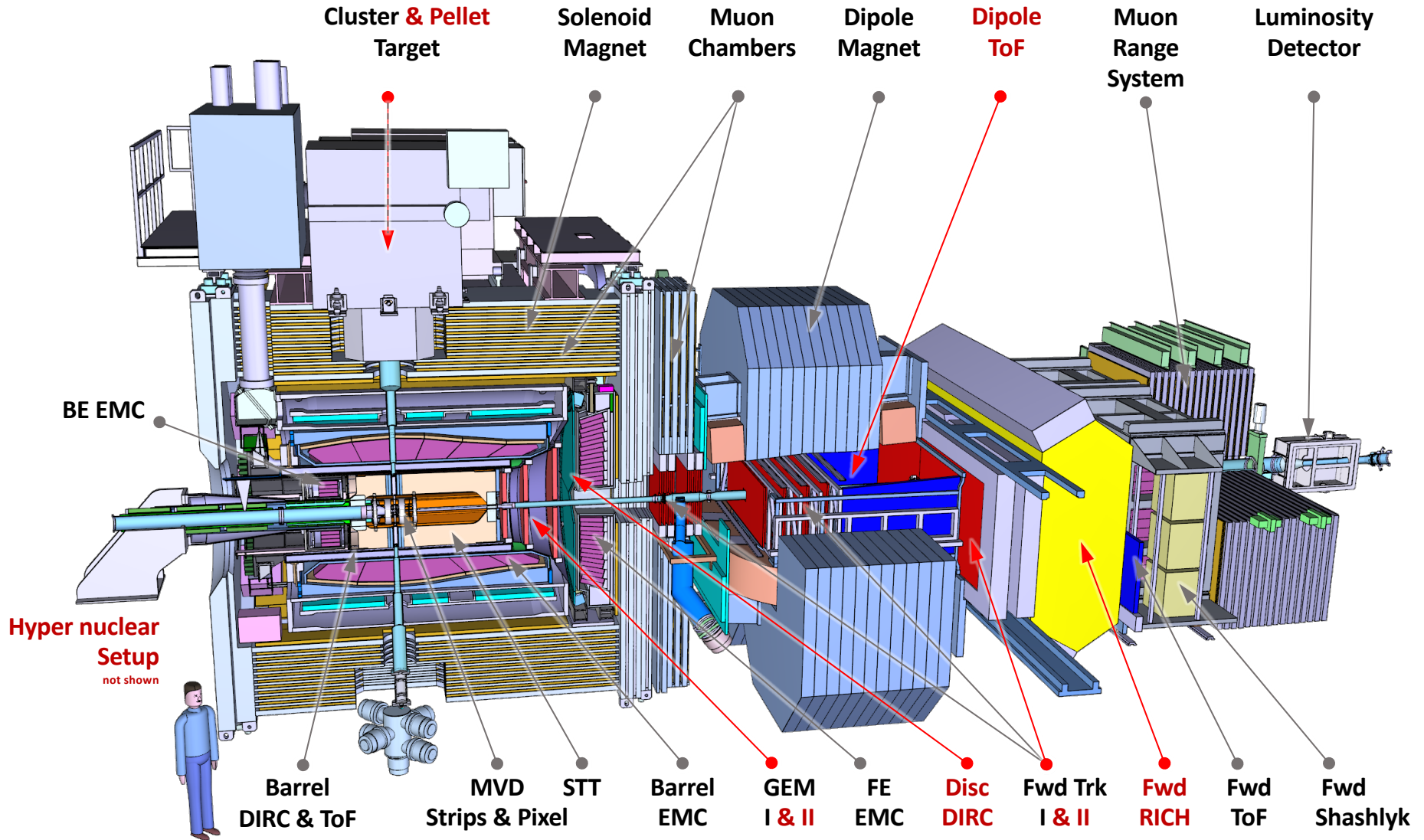
2020 **in review**  
**common fund financed**  
**DAQ**

2020 **in review**  
**common fund financed**  
**IIR**

2020 GEM 1st Draft – soon



# Full Setup



# Collaboration PANDA 2020



UP Marche Ancona  
U Basel  
IHEP Beijing  
U Bochum  
Abant Izzet Baysal  
U Golkoy, Bolu  
U Bonn  
U Brescia  
IFIN-HH Bucharest  
AGH UST Cracow  
IFJ PAN Cracow  
JU Cracow  
Cracow UT  
FAIR Darmstadt  
GSI Darmstadt  
JINR Dubna  
U Erlangen

NWU Evanston  
U Frankfurt  
LNF-INFN Frascati  
U & INFN Genova  
U Gießen  
Giresun U  
U Glasgow  
KVI-CART Groningen  
Gauhati U, Guwahati  
USTC Hefei  
URZ Heidelberg  
Doğuş U, Istanbul  
Okan U, Istanbul  
FZ Jülich  
IMP Lanzhou  
INFN Legnaro

Lund U  
HI Mainz  
U Mainz  
RINP Minsk  
NRC "Kurchatov Institute"  
- ITEP Moscow  
MPEI Moscow  
U Münster  
BINP Novosibirsk  
Novosibirsk State U  
U Wisconsin, Oshkosh  
U & INFN Pavia  
PNPI St. Petersburg  
West Boh. U, Pilzen  
Charles U, Prague  
Czech TU, Prague

IHEP Protvino  
KTH Stockholm  
Stockholm U  
SUT, Nakhon Ratchasima  
SVNIT Surat-Gujarat  
S Gujarat U, Surat-Gujarat  
FSU Tallahassee  
Nankai U, Tianjin  
U & INFN Torino  
Politecnico di Torino  
Uppsala U  
SMI Vienna  
NCBJ Warsaw  
U York

more than 420 physicists from  
from more than 65 institutions in 18 countries

## Management Team

Spokesperson and Deputy  
Spokesperson and Deputy elect (Jan 1, 2021)  
Collaboration Board Chair and Deputy  
Technical Coordinator and Deputy  
Physics Coordinator and Deputy  
Resource Coordinator  
Computing Coordinator and Deputy  
plus some more appointed members

Klaus Peters, Tord Johansson  
Ulrich Wiedner, Karin Schönning  
Frank Goldenbaum, Andrey Rysantsev  
Lars Schmitt, Tassos Belias  
Johan Messchendorp, Frank Nerling  
Ralph Böhm  
Tobias Stockmanns, Ralf Kliemt

## Standing Committees

### by delegation

Collaboration Board (inst. rep.), Finance Board (country rep.)

### appointed by CB

Technical Board (sys. managers), Physics Committee (conveners), Computing Committee

### elected by CB

Publication Committee, Speaker's Committee, Membership Committee, Award Committee

+ ad hoc if necessary

## Theoretical Advisors

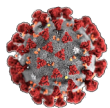
Theory Advisory Group

## Young Scientists

Young Scientist Convent

Decisions are made by the Collaboration Board with the exception of the Spokesperson election which need the majority of the entire collaboration

- Lockdown Spring/early Summer (1<sup>st</sup> wave) in many labs involved in component construction for PANDA created production delays
  - reported in ECE in May
- Potential (or already existing) lockdowns (2<sup>nd</sup> wave) can not be excluded
  - consequences cannot be evaluated right now because of the fast development
- Slowdown of design progress
  - Anyhow: we finalized 2 of the 3 missing documents
- Due to ongoing/renewed contact and travel restrictions
  - Joint projects are postponed
  - Evaluation sample tests are slowed down



# Scorecard & Finances



PANDA		TDR / Specs	Cost [k€ 2005]	% Funding (Sec / RUS / EoI / TBA)	Construction	Construction complete	Test/ Commissioning	
Day-1	Cluster Jet Target		771,00			08/2022		
	Micro Vertex Detector (MVD) - Str		2.550,00			05/2023		
	Micro Vertex Detector (MVD) - Pix		2.091,00			12/2023		
	Straw Tube Tracker (STT) (1)		2.603,00			09/2023		
	Planar GEM Tracker - 50%		555,00			12/2023		
	Barrel DIRC		2.782,00			04/2023		
	Barrel Time of Flight (TOF)		310,00			01/2023		
	Forward Tracking (w/o FT 5/6) (1)		1.145,00			08/2024		
	Forward TOF (2)		362,00			06/2023		
	Barrel EMC System		8.001,00			05/2023		
	Barrel EMC Crystals - 75% (2)		8.634,00			05/2023		
	Backward Endcap EMC		1.309,00			06/2023		
	Forward Endcap EMC		5.674,00			06/2022		
	Forward Shashlyk Calorimeter (2)		1.447,00			06/2023		
	Luminosity Detector		666,00			06/2023		
	Muon Detectors (2)		2.318,00			09/2022		
	Solenoid		5.800,00			04/2022		
	Interaction Region		151,00			12/2022		
	Infrastructure	both submitted		4.006,00			06/2022	
	DAQ Hardware (3)	submitted		1.350,00			09/2023	
→ brings PANDA to ~99%		89% value weighted	52.525,00	69%	16%	14%	1%	
Changes since report 20-I		1%		+1% secured	Common Fund	36% value weighted +3.7%	1% value weighted +0%	

To be updated when hall availability is clarified

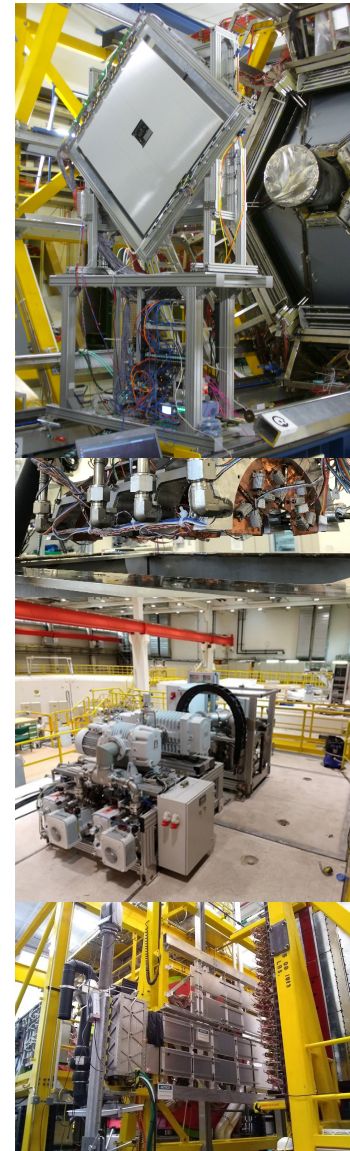
- (1) if synergies between STT and Fw. Tracking realise
- (2) if German-Russian Roadmap realised

(3) DAQ computing via operation funds

Despite delay due to Covid-19 and hall availability

→ **impactful science** and preparatory work is going on in numerous Phase-0 projects

- **@GSI**  
PANDA @ HADES (PANDA-like Straw Tracker + Hyperon physics)
- **@MAMI (Mainz)**  
PANDA @ MAMI (PANDA Backward EMC + Primakoff Pion e-prod.)
- **@COSY (FZJ)**  
KOALA @ COSY (PANDA Lumi Detector Prototype, pp scattering)  
PANDA @ COSY (PANDA Cluster-Jet Target)
- **@JLab (Newport News)**  
DIRC @ GlueX (Handling, Commissioning Experience, Calibration)  
Light Quark Physics Analysis @ GlueX (Tools and techniques)
- **@IHEP (Beijing)**  
Charm Quark Physics Analysis @ BES3 (Tools and techniques)







# panda.gsi.de

Search

**+++ RECENT NEWS +++**

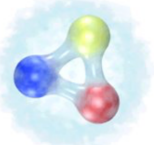
**PANDA Annual Report 2019**  
Very good progress has been made by PANDA in 2019

**Outstanding Achievement Awards 2019**  
go to IHEP and GSI, HI Mainz and U Frankfurt



**Welcome to the PANDA Experiment Website**

The PANDA Experiment will be one of the key experiments at the Facility for Antiproton and Ion Research (FAIR) which is under construction and currently being built on the area of the GSI Helmholtzzentrum für Schwerionenforschung in Darmstadt, Germany. The central part of FAIR is a synchrotron complex providing intense pulsed ion beams (from p to U). Antiprotons produced by a primary proton beam will then be filled into the High Energy Storage Ring (HESR) which collide with the fixed target inside the PANDA Detector.



The PANDA Collaboration with more than 420 scientist from 18 countries intends to do basic physics research on various topics around the weak and strong forces, exotic states of matter and the structure of hadrons. In order to gather all the necessary information from the antiproton-proton collisions a versatile detector will be build being able to provide precise trajectory reconstruction, energy and momentum measurements and very efficient identification of charged particles.

# Thank you