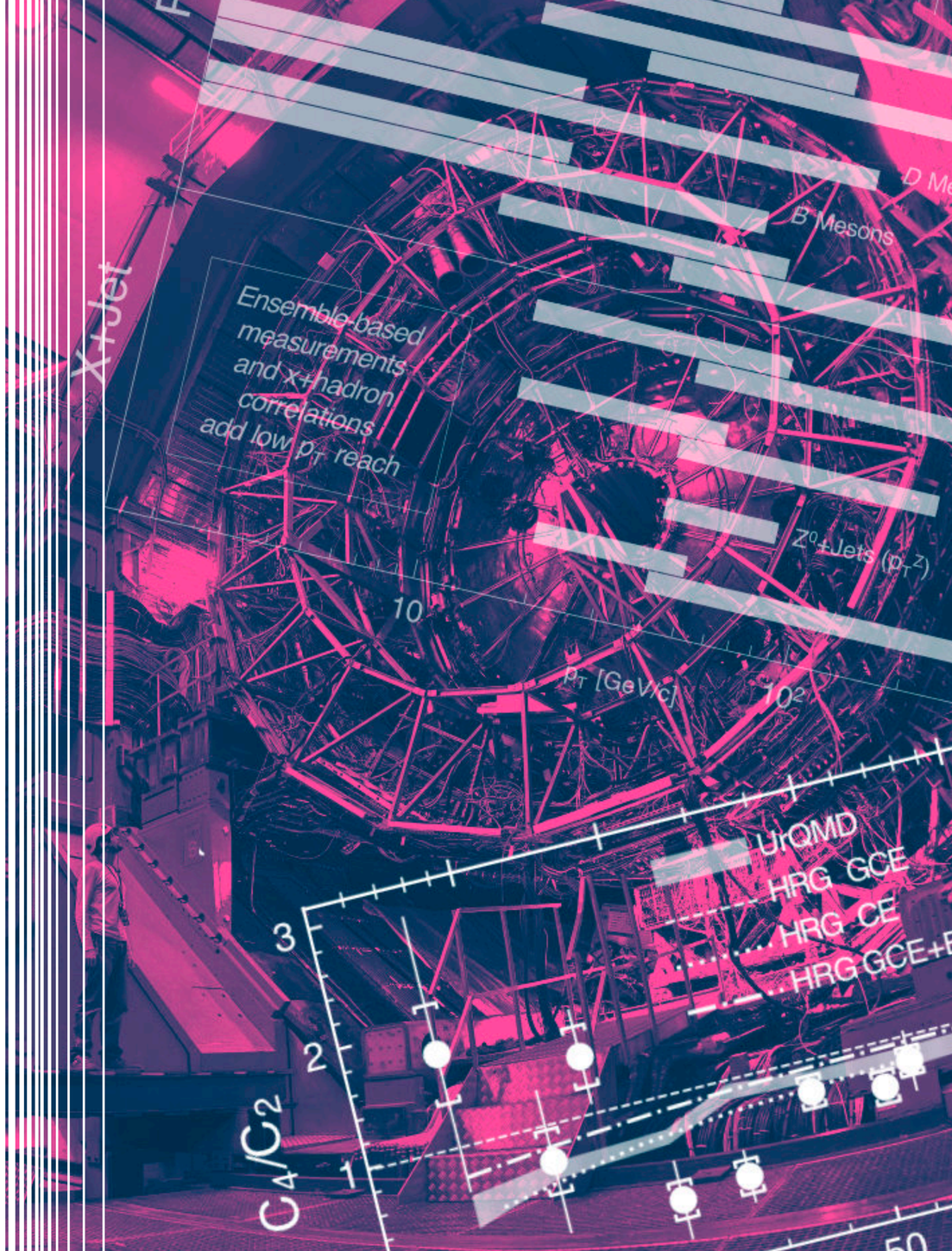
ROUND TABLE:

NEW EXPERIMENTAL POSSIBILITIES IN HICS

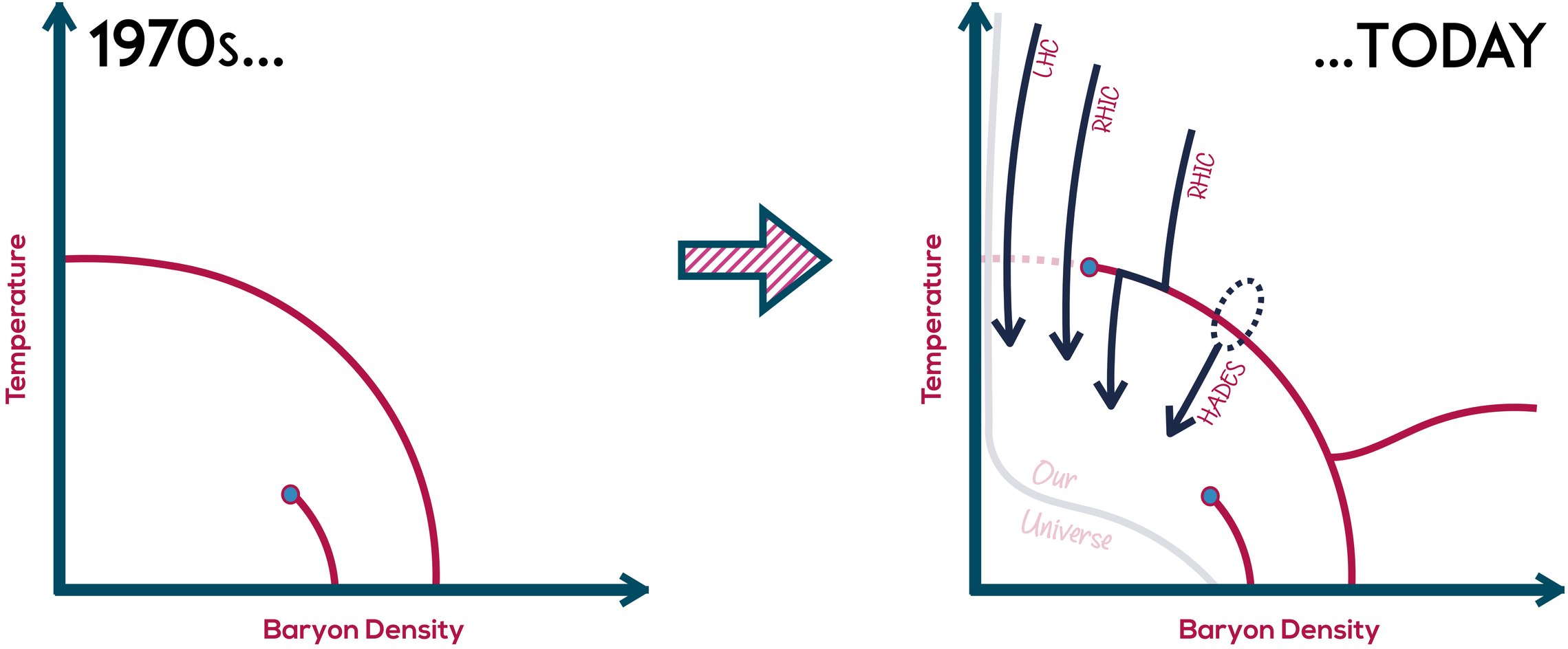
Oscar Garcia-Montero and
Renan Hirayama

CRC retreat
Halberstadt, 2024

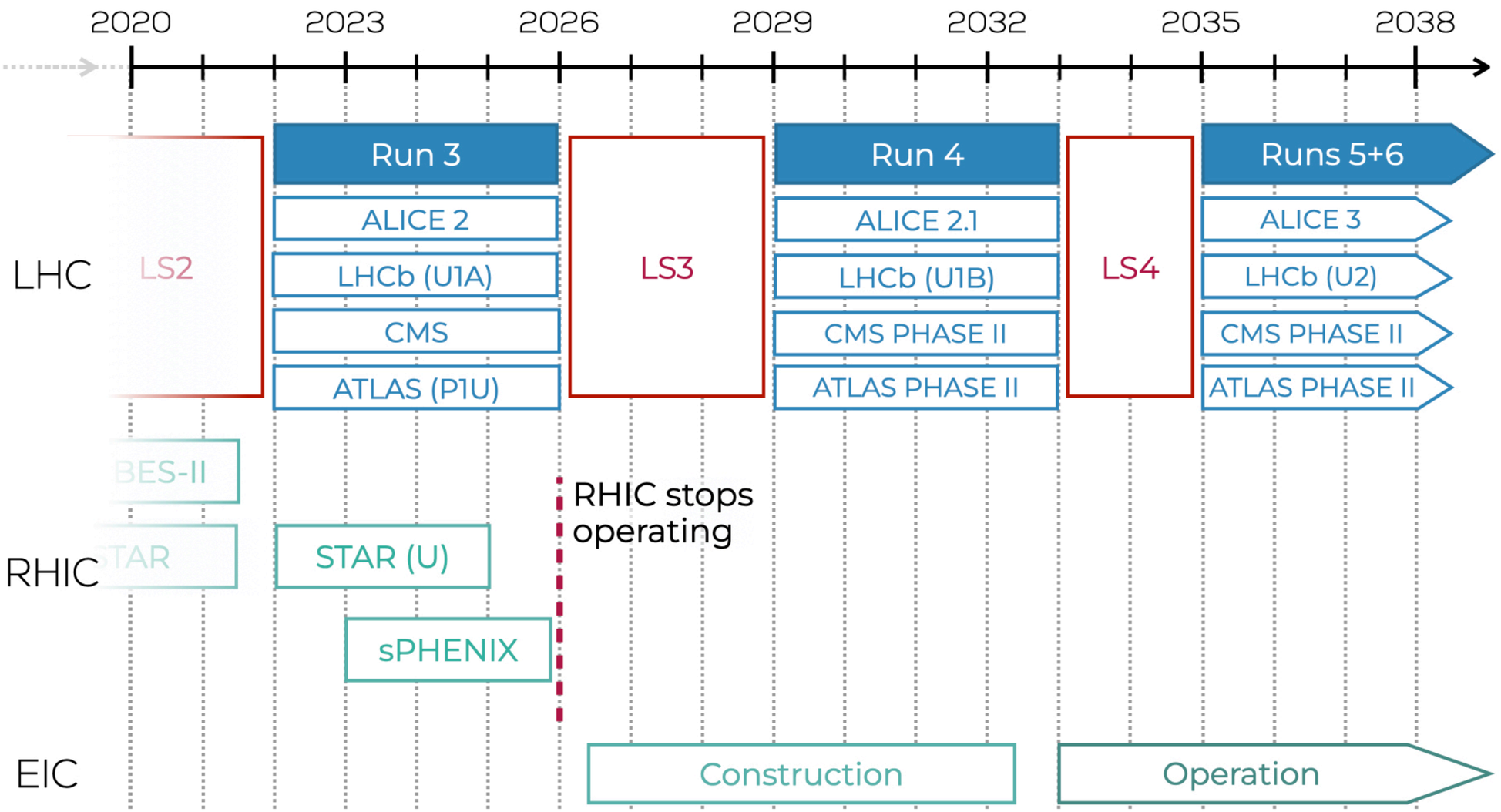
CRC-TR 211
Strong-interaction matter
under extreme conditions



PAST...


1970s...
Temperature
Baryon Density
...TODAY
LHC
RHIC
RHIC
HADES
Our
Universe
Temperature
Baryon Density

… AND FUTURE!


2020
2023
2026
2029
2032
2035
2038
LHC
LS2
Run 3
ALICE 2
LHCb (U1A)
CMS
ATLAS (P1U)
LS3
Run 4
ALICE 2.1
LHCb (U1B)
CMS PHASE II
ATLAS PHASE II
LS4
Runs 5+6
ALICE 3
LHCb (U2)
CMS PHASE II
ATLAS PHASE II
BES-II
RHIC
STAR
STAR (U)
sPHENIX
RHIC stops operating
EIC
Construction
Operation

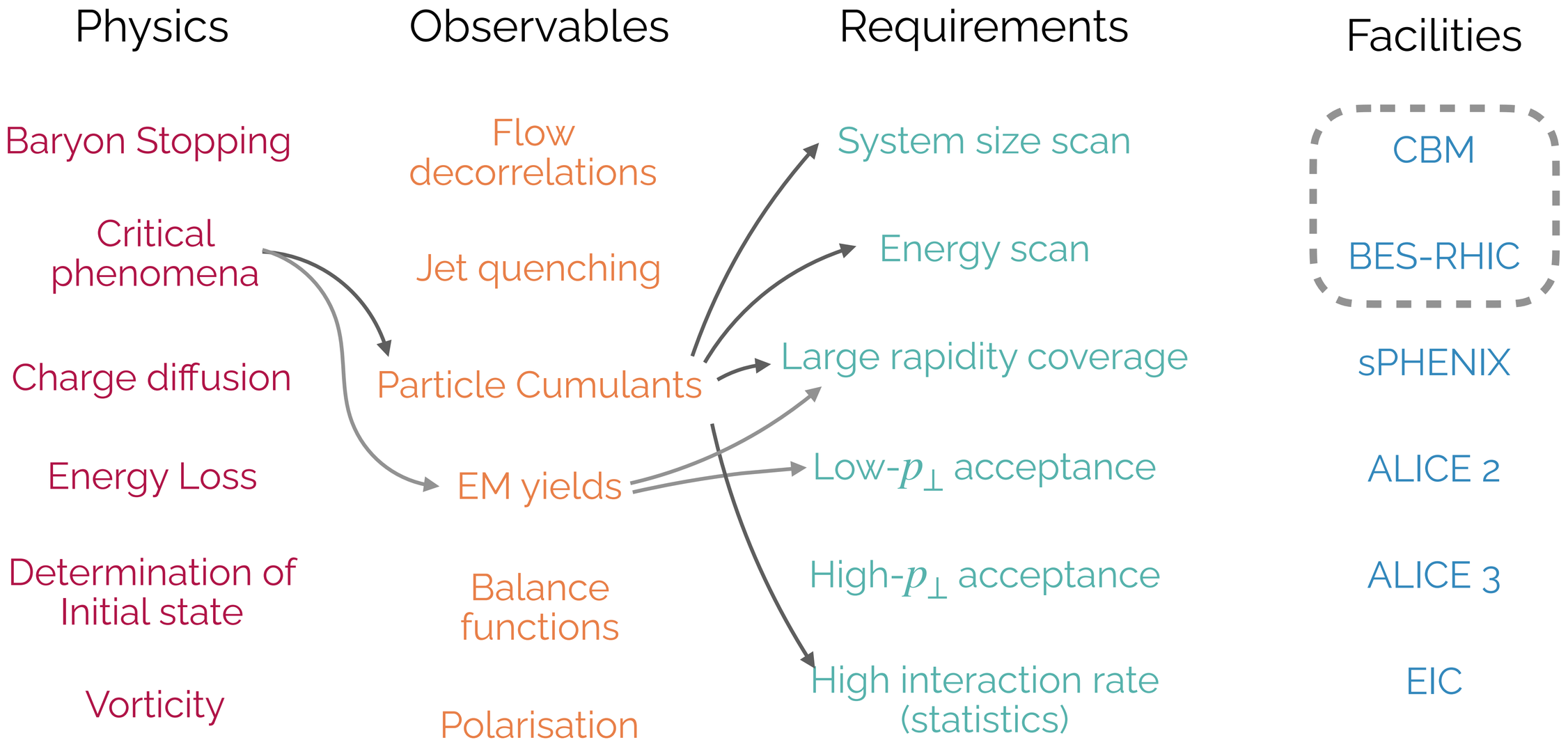
GOALS FOR THIS ROUND TABLE

- Connect a number of open questions - *from theory* - to the capabilities of new detectors
- At **best**: come up with new observables that will be accessible in the upcoming experiments
- At **least**: understand the existing observables and how to make better predictions

OPEN QUESTIONS

Physics	Observables	Requirements	Facilities
Baryon Stopping	Flow decorrelations	System size scan	CBM
Critical phenomena	Jet quenching	Energy scan	BES-RHIC
Charge diffusion	Particle Cumulants	Large rapidity coverage	sPHENIX
Energy Loss	EM yields	Low-$p_\perp$ acceptance	ALICE 2
Determination of Initial state	Balance functions	High-$p_\perp$ acceptance	ALICE 3
Vorticity	Polarisation	High interaction rate (statistics)	EIC

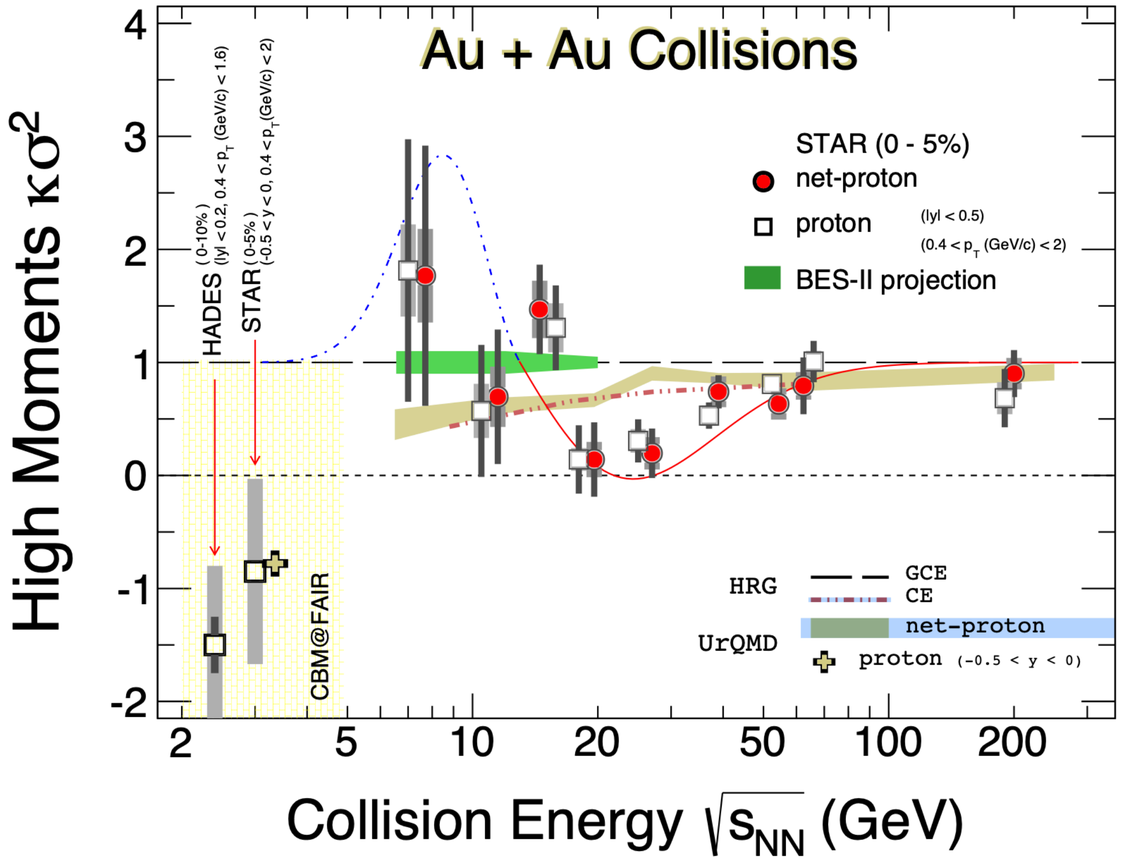
OPEN QUESTIONS

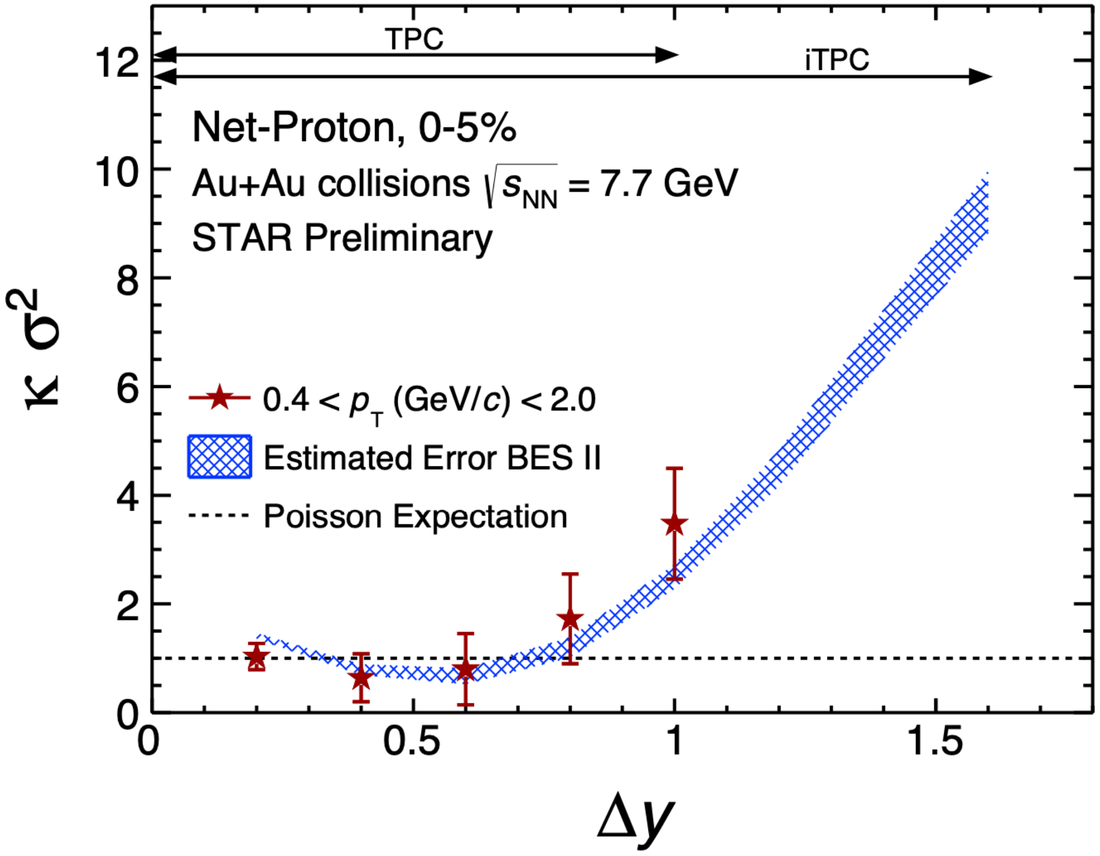


OPEN QUESTIONS:

How can we infer the location of the expected Critical Endpoint?

Theory: CEP $\Rightarrow \kappa < 0$





Experiment: several caveats

STRUCTURE

1) Introduction and generalities **(90 min)**

2) New facilities at Low energies **(120 min)**

3) New facilities at Intermediate energies **(60 min)**

4) New facilities at High energies **(120 min)**

5) Wrap-up and report **(60+60 min)**