

Strangeness production in the NA61/SHINE experiment at the CERN SPS energy range



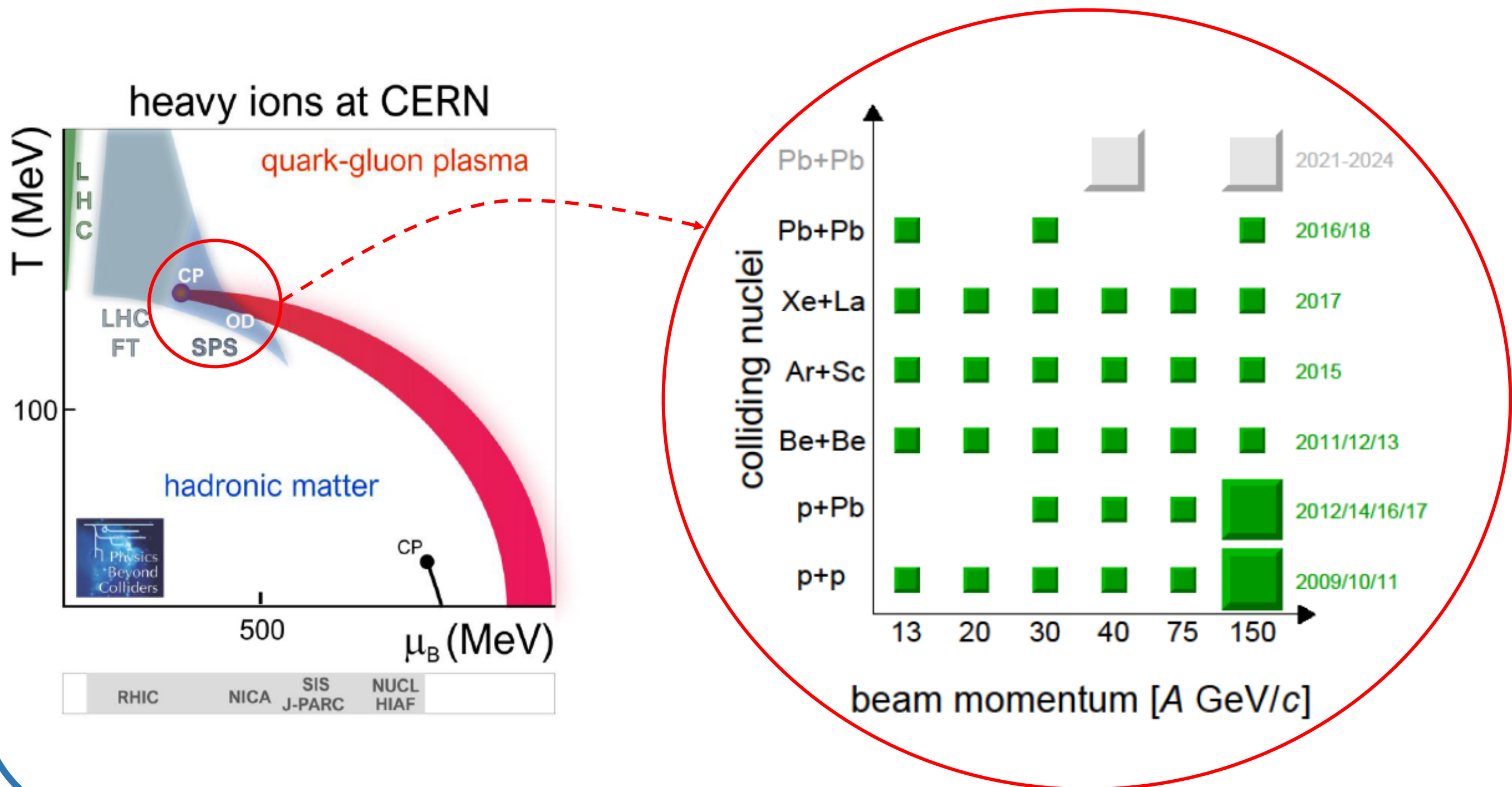
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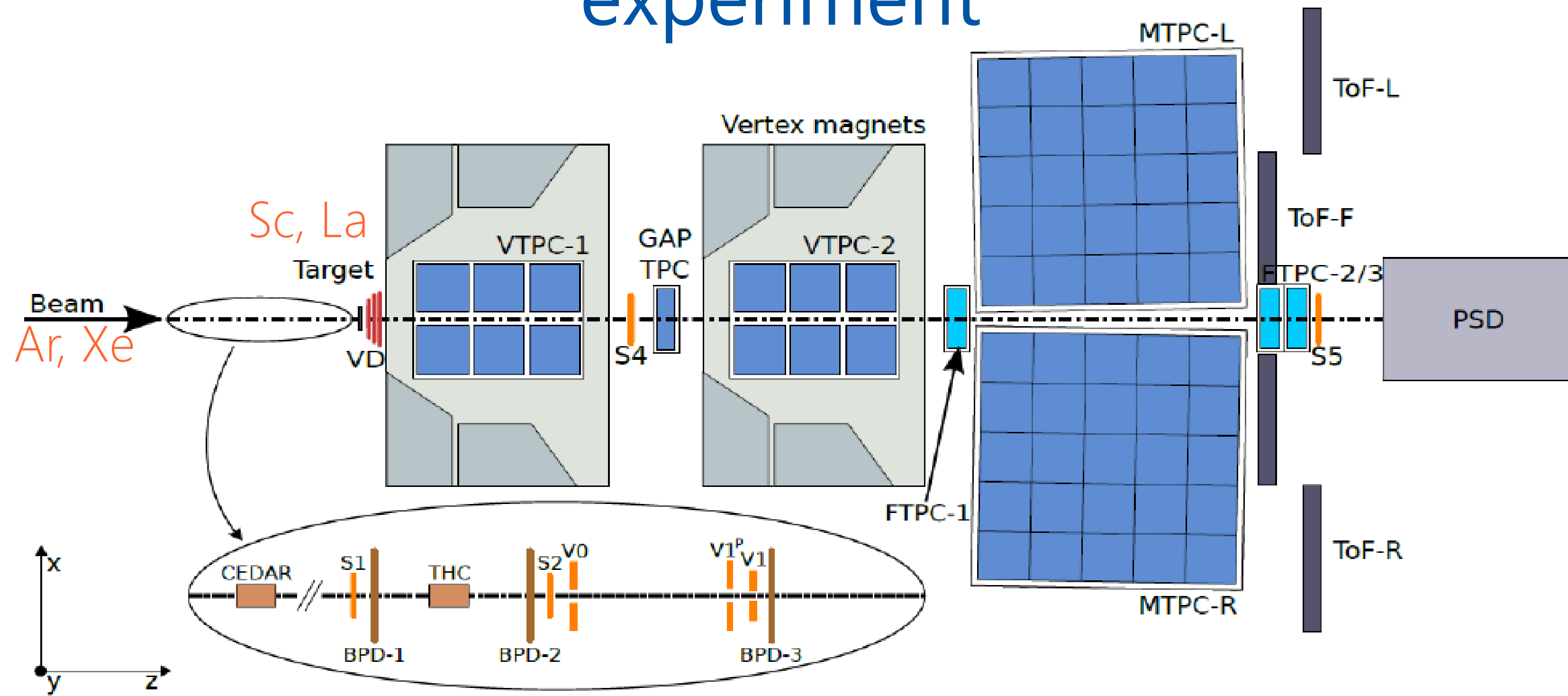


NA61/SHINE two-dimensional scan

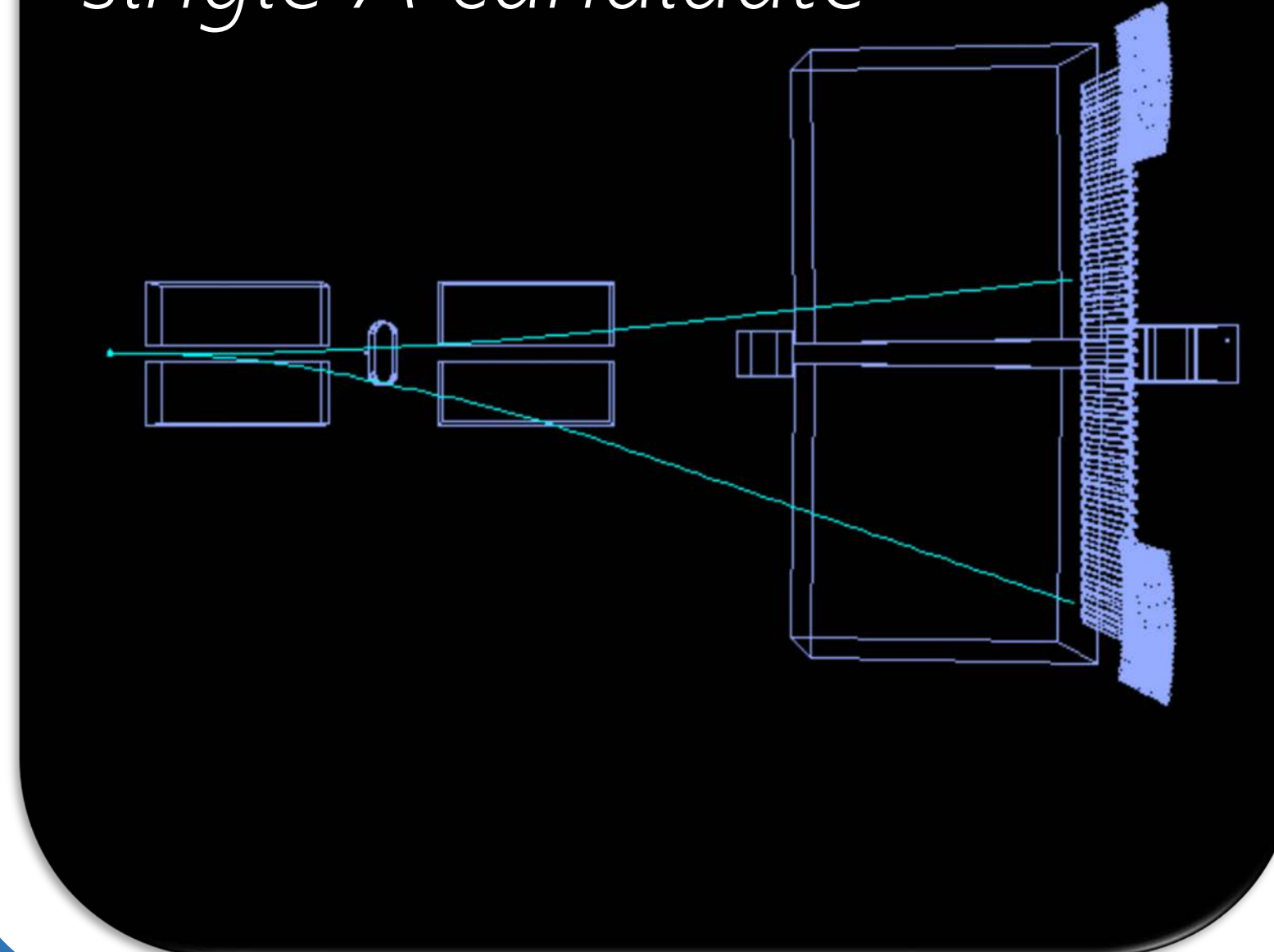
NA61/SHINE performed a collision energy and system size 2D scan to study the phase diagram of strongly interacting matter.



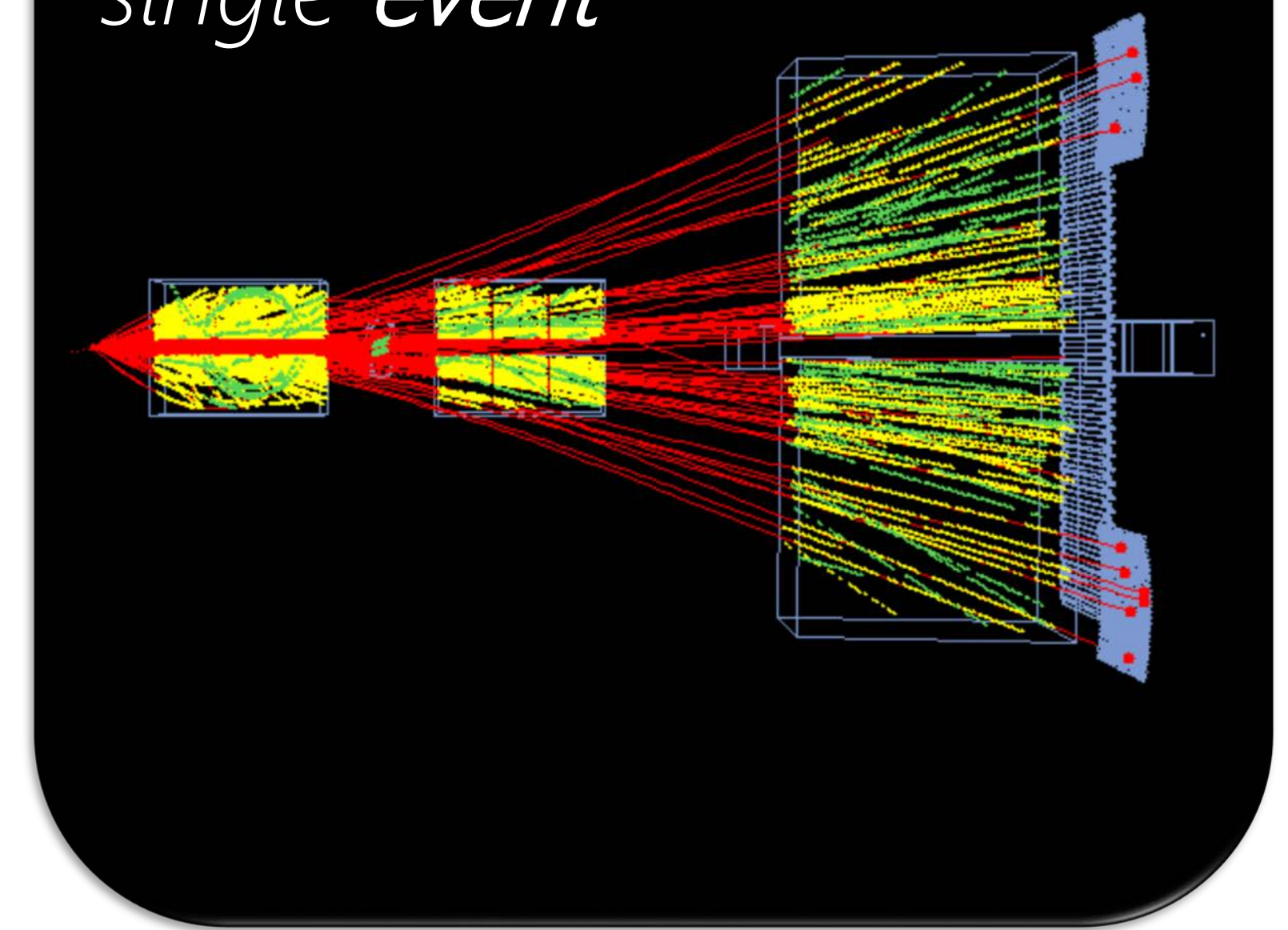
Schematic layout of the NA61/SHINE experiment



Ar+Sc@75 GeV/c
single Λ candidate

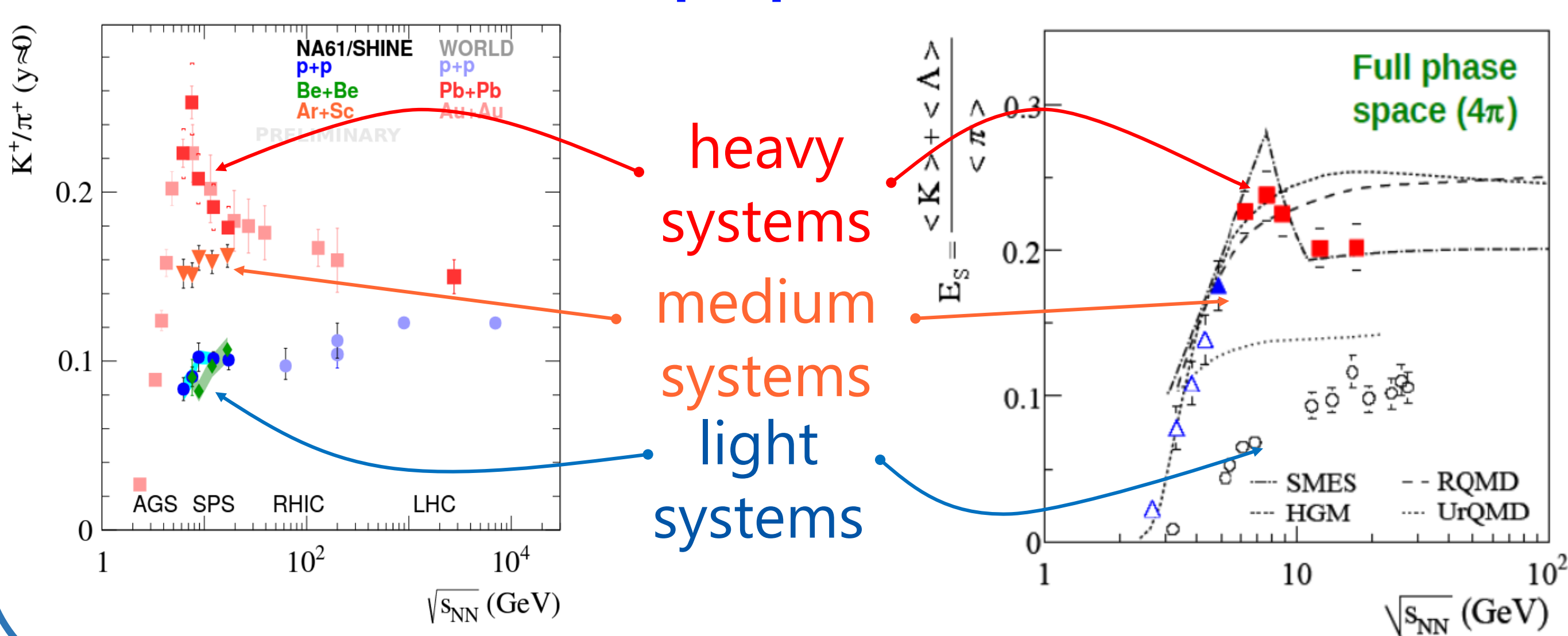


Ar+Sc@75 GeV/c
single event

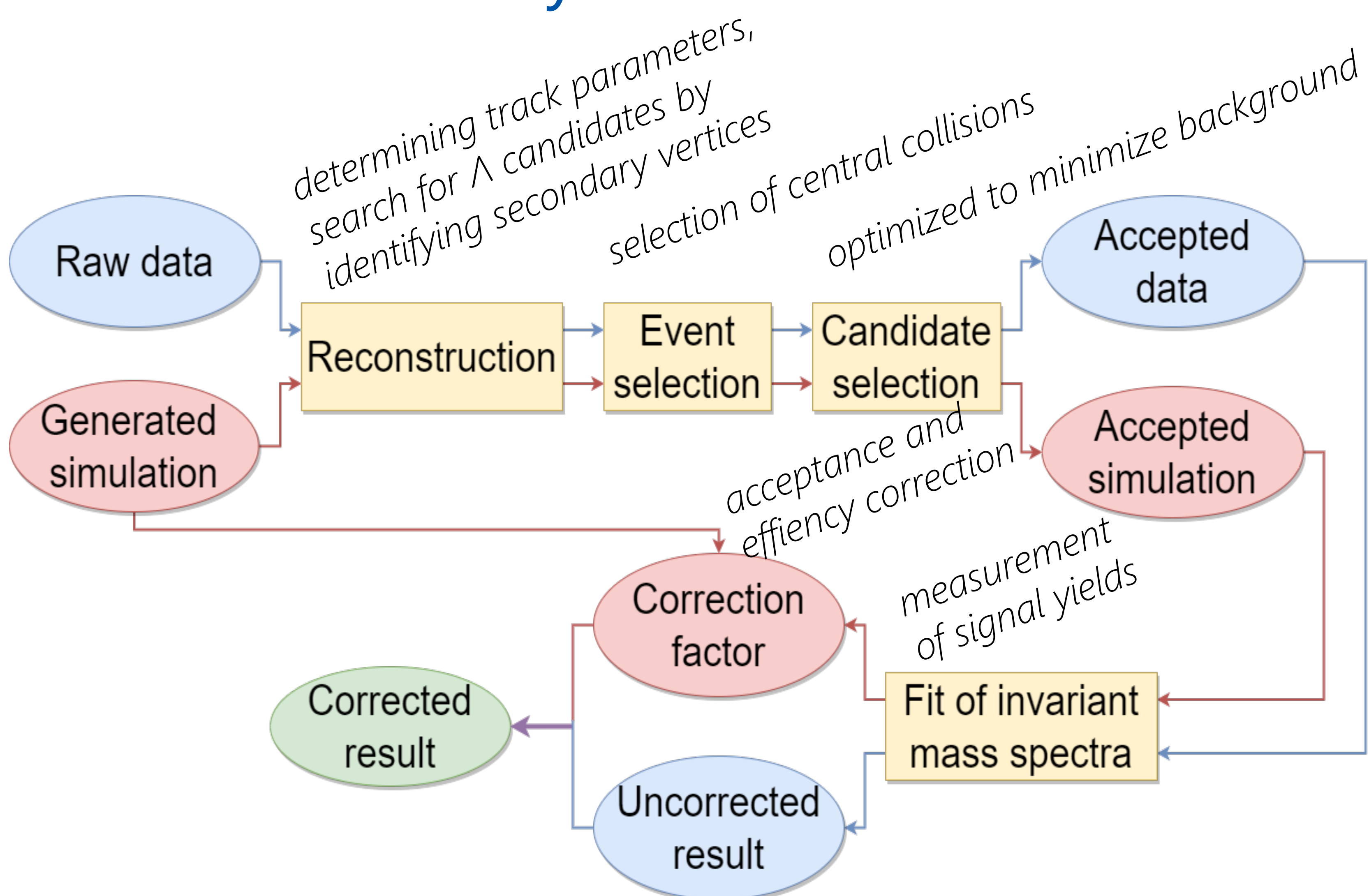


Onset of deconfinement: horn

Rapid changes in strangeness production E_s („horn“) were observed in **Pb+Pb/Au+Au** collisions at SPS energies, which was predicted by SMES as a signature of onset of deconfinement. On the other hand, plateau-like structure is visible in **p+p** and **Be+Be**.



Analysis workflow

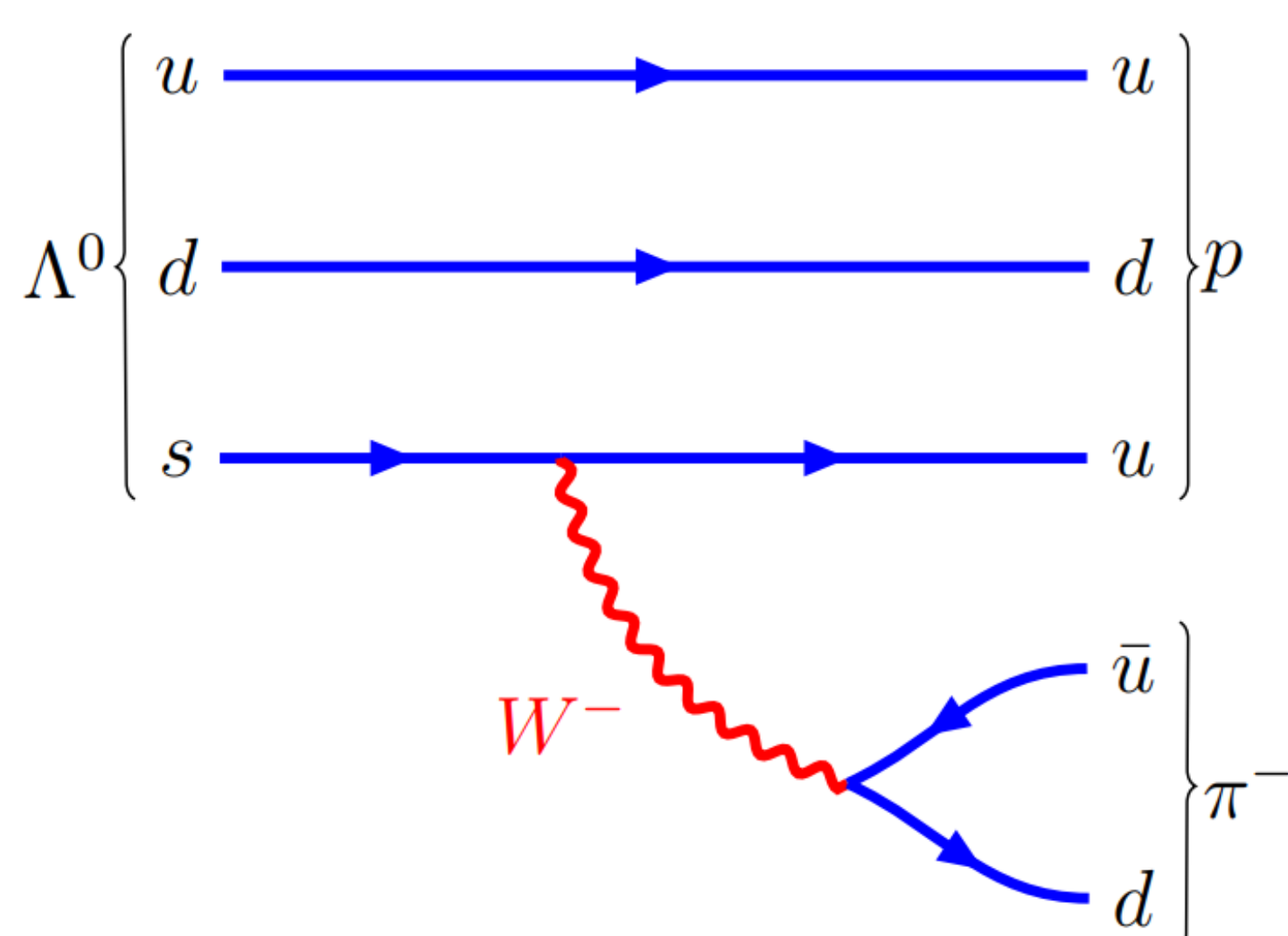


General research plan

The main goal of the project is to measure Λ^0 and $\bar{\Lambda}^0$ produced in **Ar+Sc** and **Xe+La** interactions at SPS energy range.

Properties of Lambda baryon [PDG]:

- rest mass $m = 1115.683 \pm 0.006 \text{ MeV}$
- mean lifetime
 - $\tau = (2.632 \pm 0.020) \times 10^{-10} \text{ s}$
 - $c\tau = 7.89 \text{ cm}$
- main decay modes
 - $p\pi^- \Gamma_i/\Gamma = (63.9 \pm 0.5) \%$
 - $n\pi^0 \Gamma_i/\Gamma = (35.8 \pm 0.5) \%$



Expected analysis outcome

- two-dimensional spectra in rapidity-transverse momentum phase space
- one-dimensional transverse momentum spectra
 - fitted with exponential function to obtain inverse slope parameter T
- one-dimensional rapidity spectra
 - fitted with a sum of Gaussians to obtain total mean multiplicity
- fill in „horn“ plot with data from intermediate systems