# 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 the strongly interacting matter.

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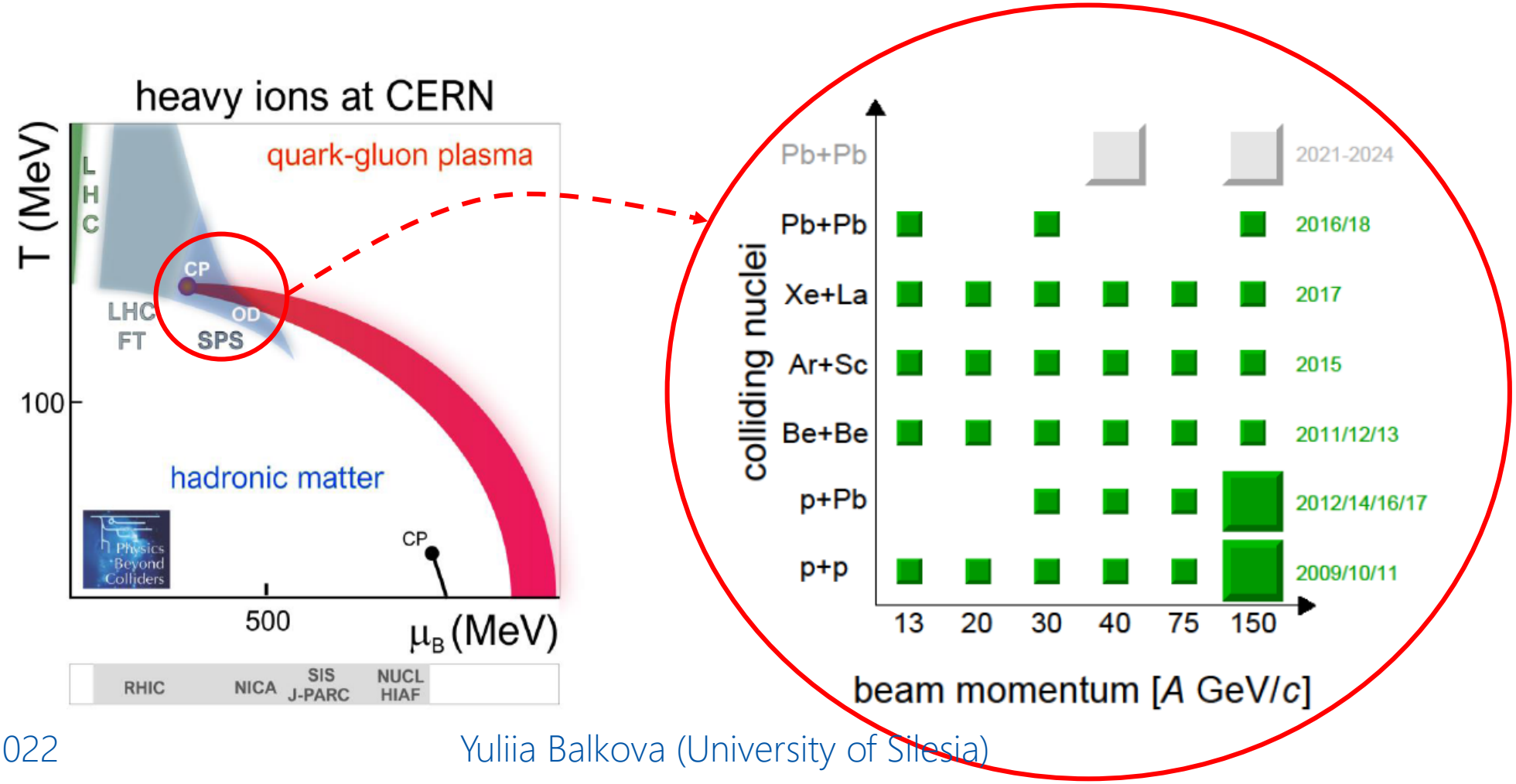
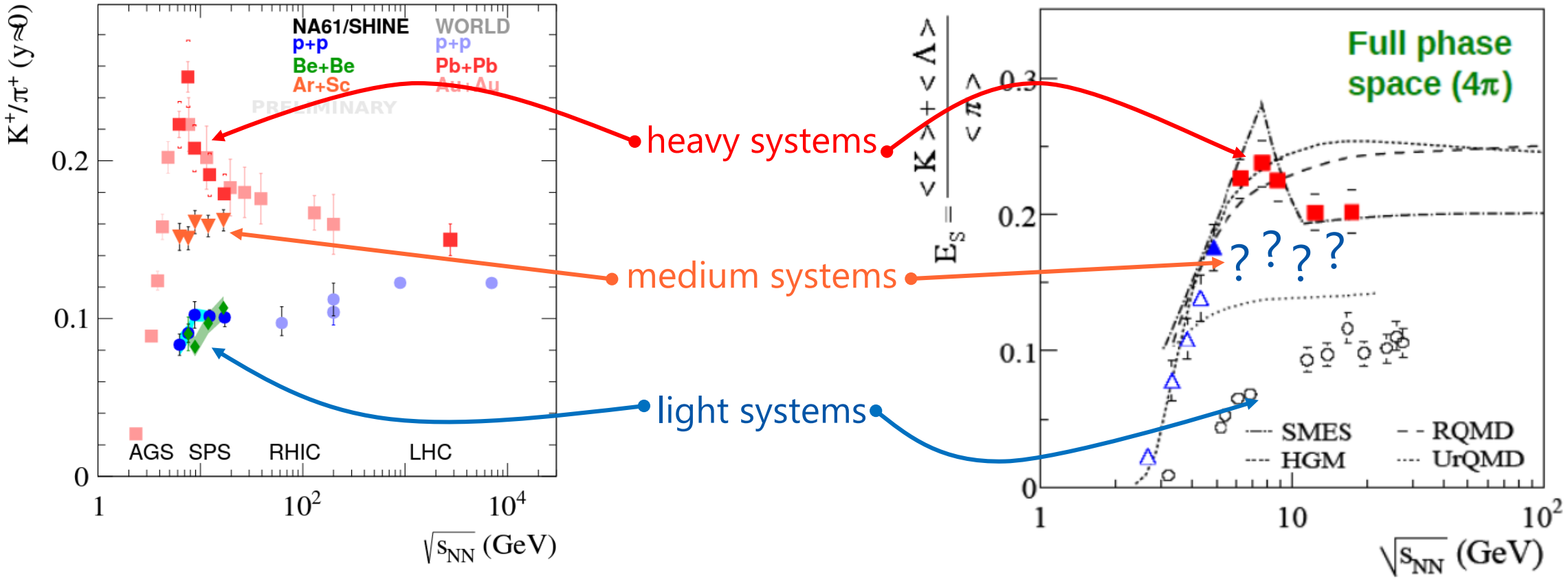


# Onset of deconfinement: horn

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**.

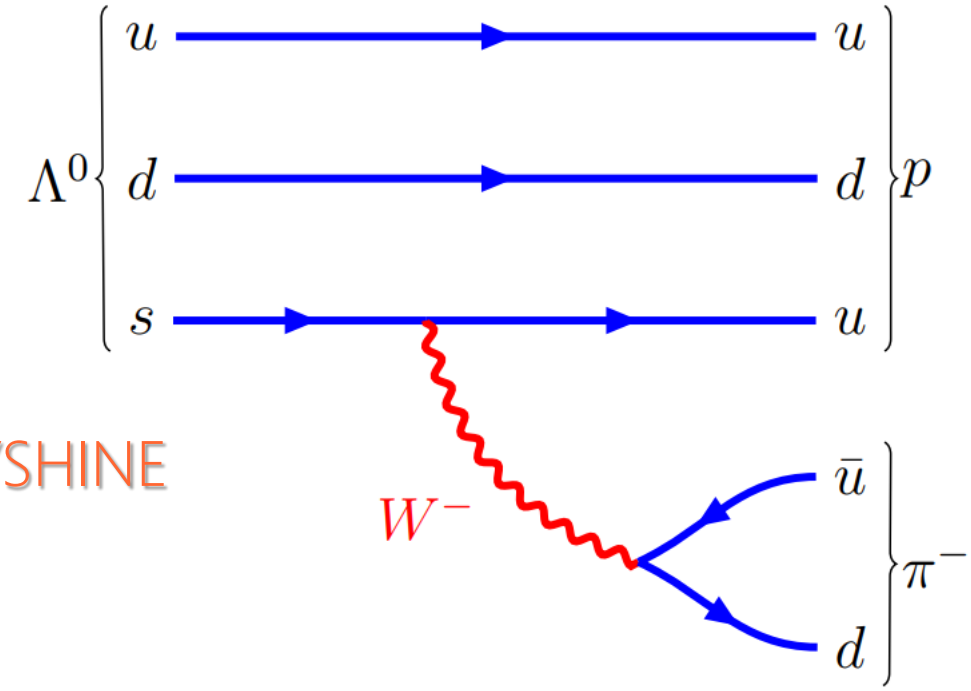


# General research plan

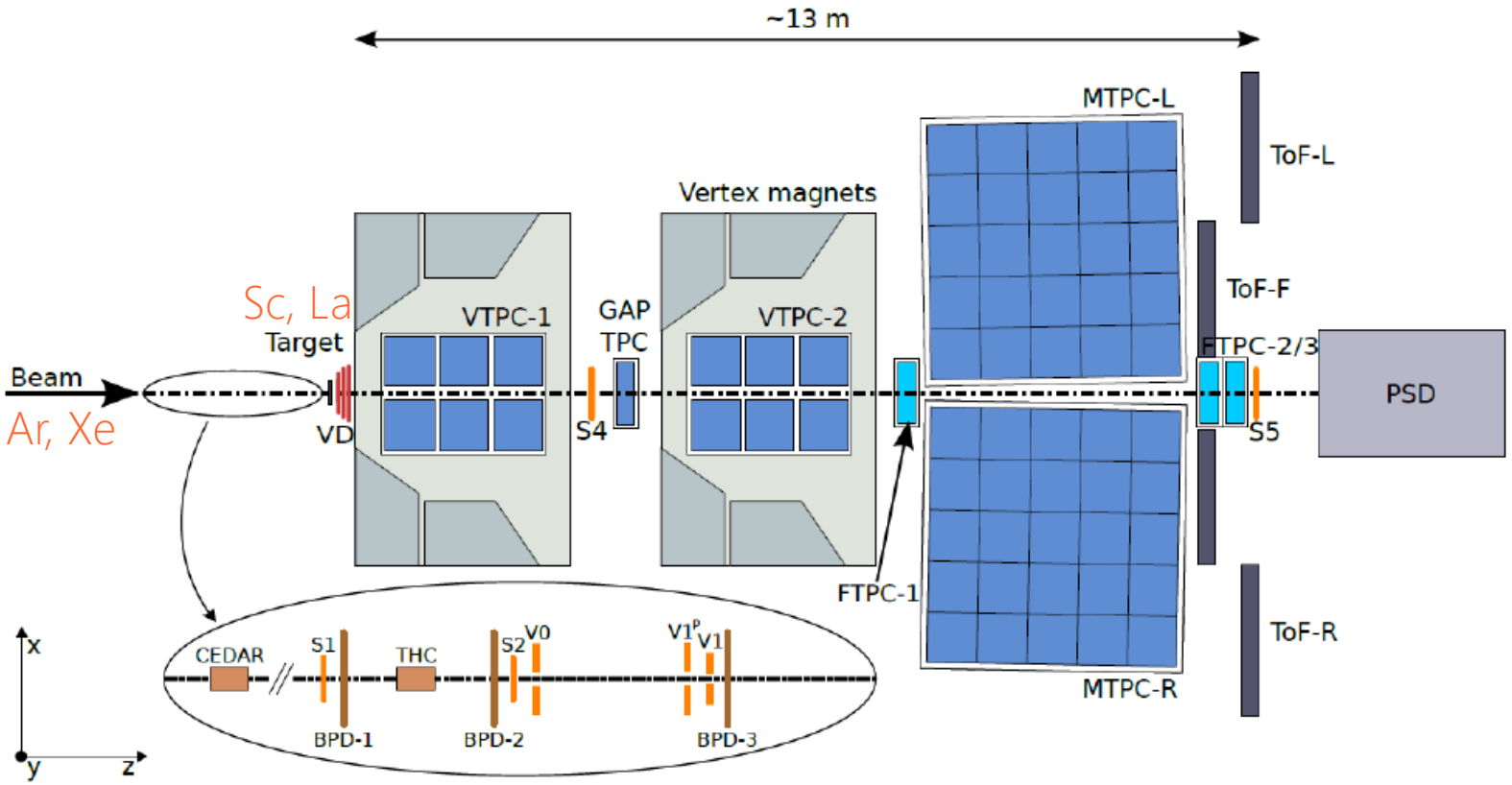
The main goal of the proposed project is to measure $\Lambda^0$ and $\bar{\Lambda}^0$ produced in Ar+Sc and Xe+La interactions at SPS energy range.

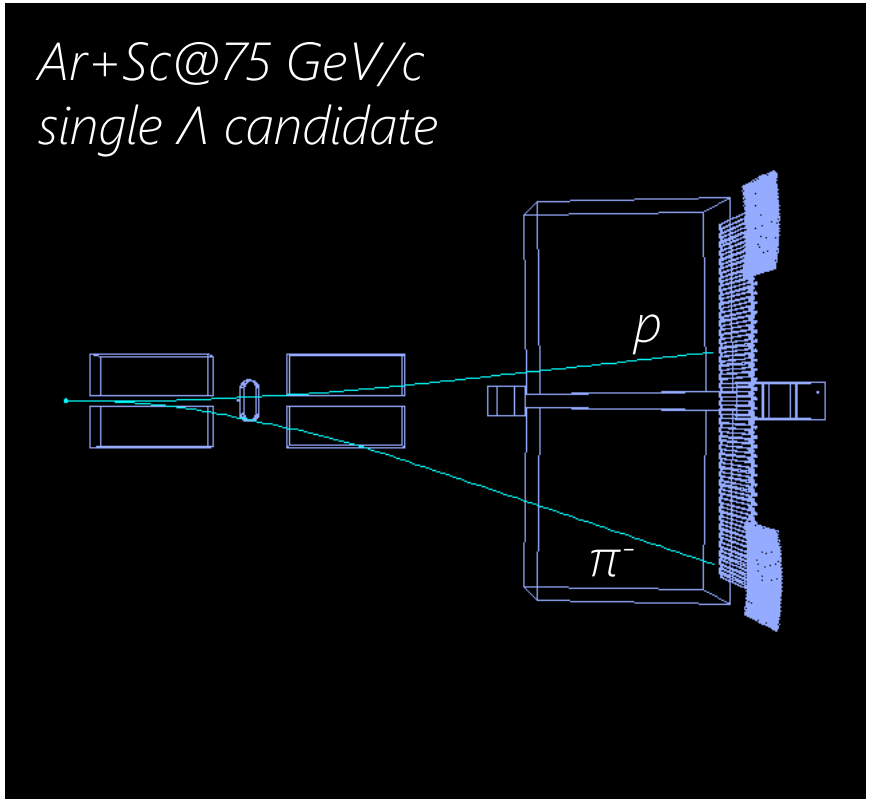
Properties of Lambda baryon [PDG]:

- rest mass $m = 1115.683 \pm 0.006\ MeV$
- mean lifetime $\tau = (2.632 \pm 0.020) \times 10^{-10}\ s$
  - $c\tau = 7.89\ cm$
- main decay modes
  - $p\pi^-$ $\Gamma_i/\Gamma = (63.9 \pm 0.5)\ \%$ - used in NA61/SHINE
  - $n\pi^0$ $\Gamma_i/\Gamma = (35.8 \pm 0.5)\ \%$



# Schematic layout of the NA61/SHINE experiment



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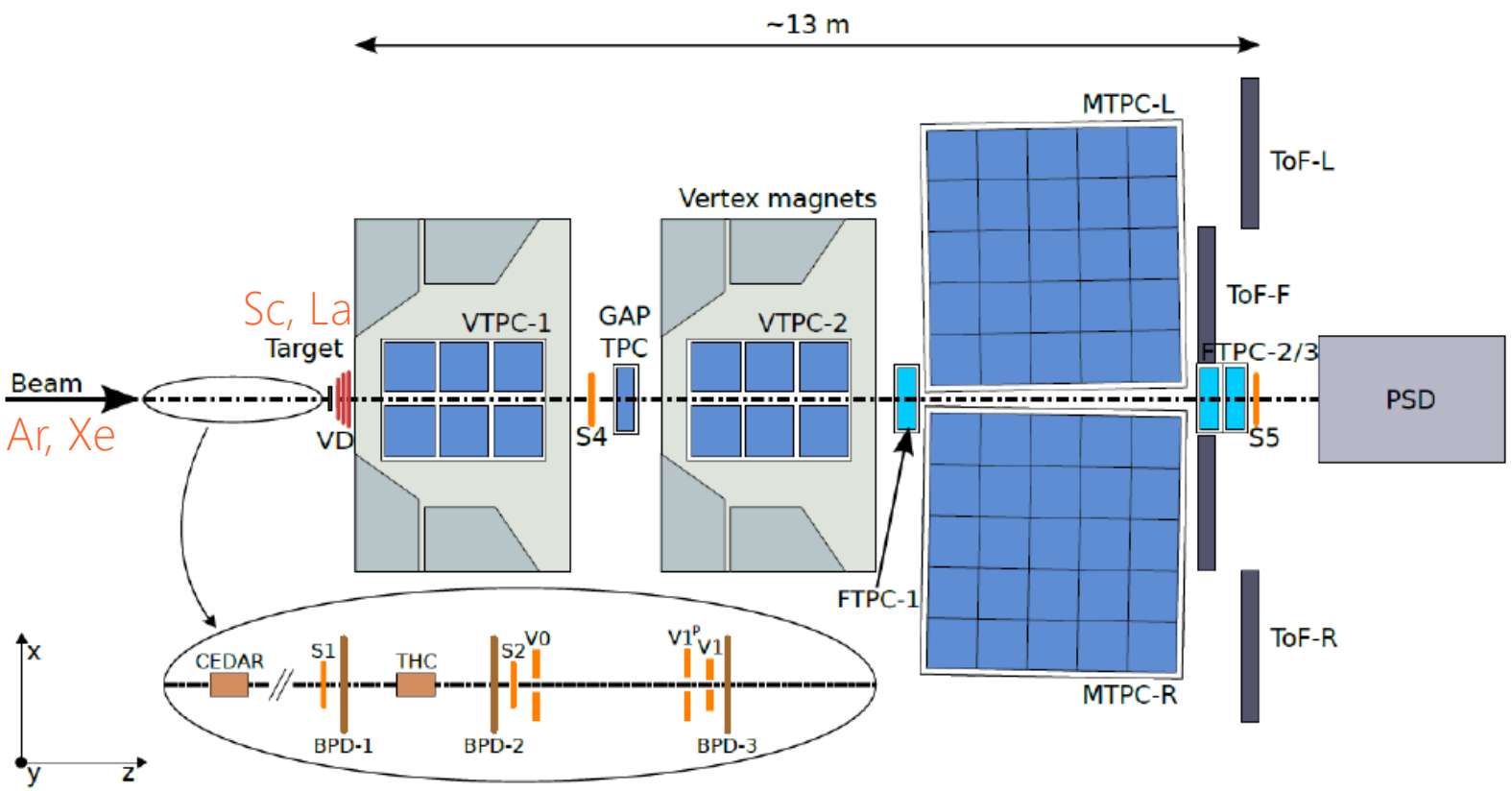
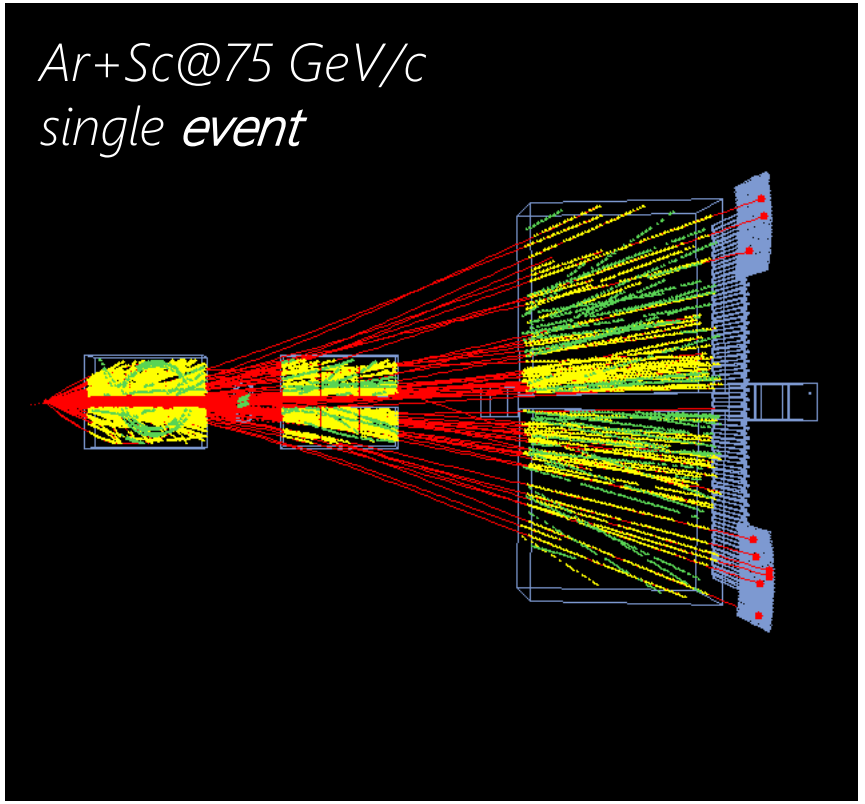
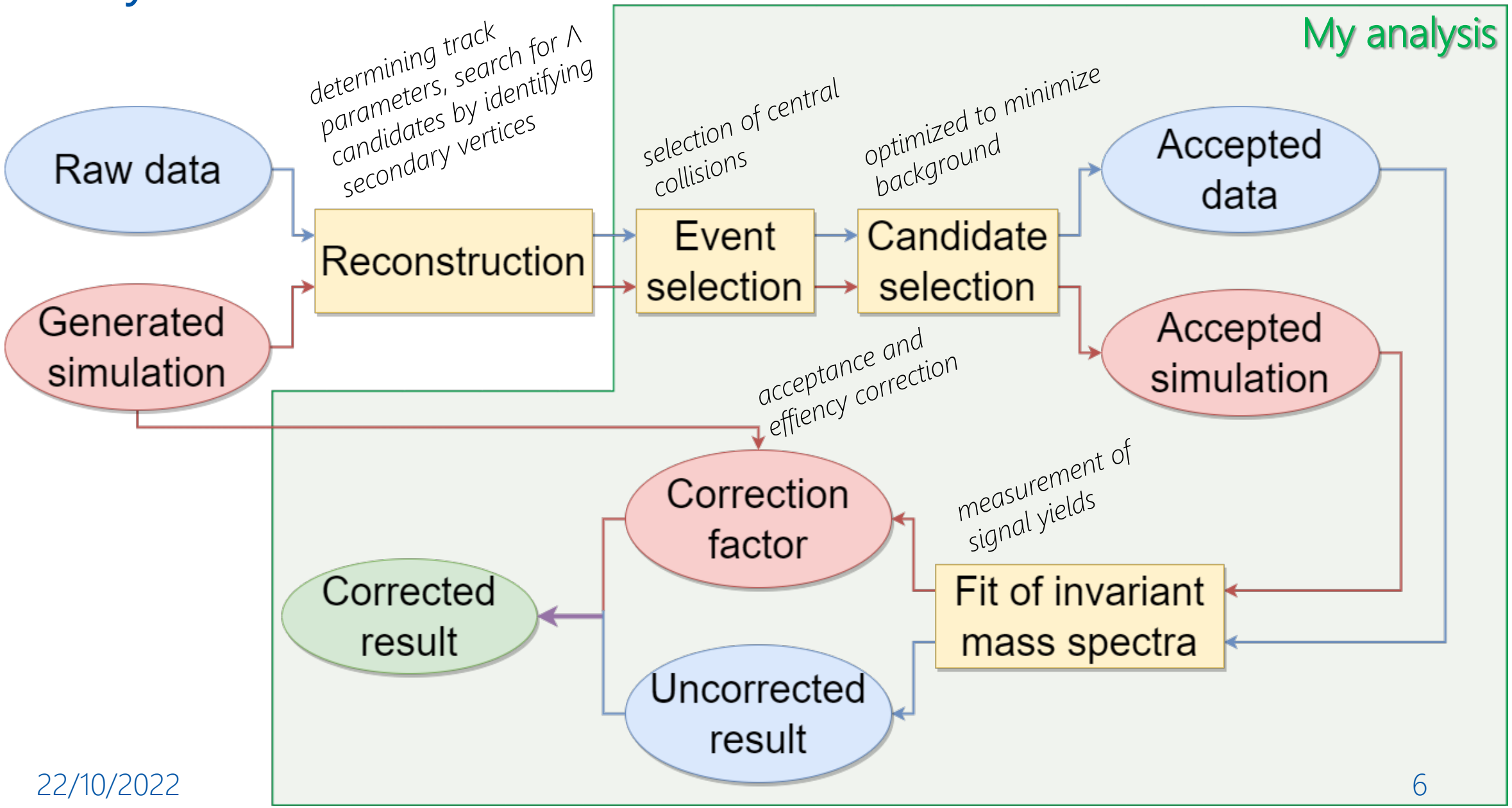


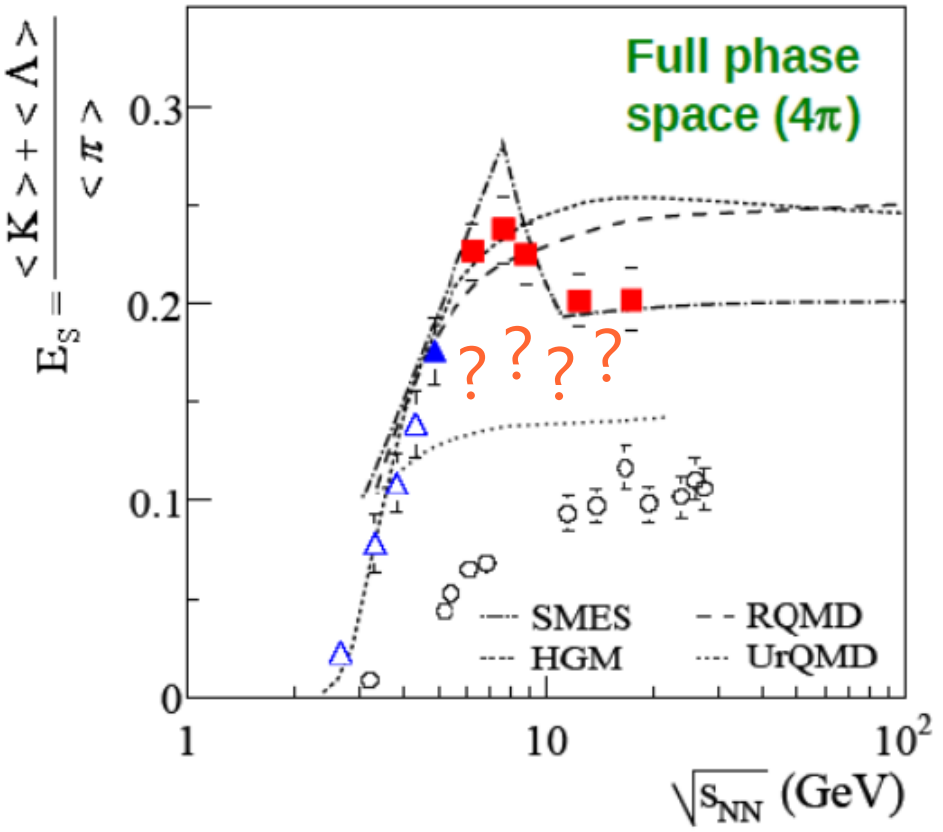



# Analysis workflow



# 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



# Thank you for your attention!

All comments and questions are very welcome:
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