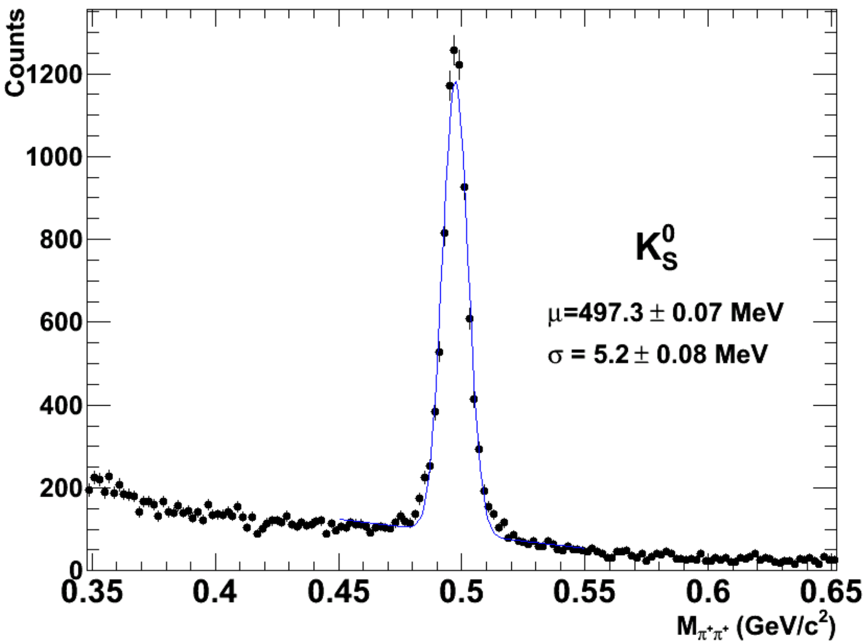
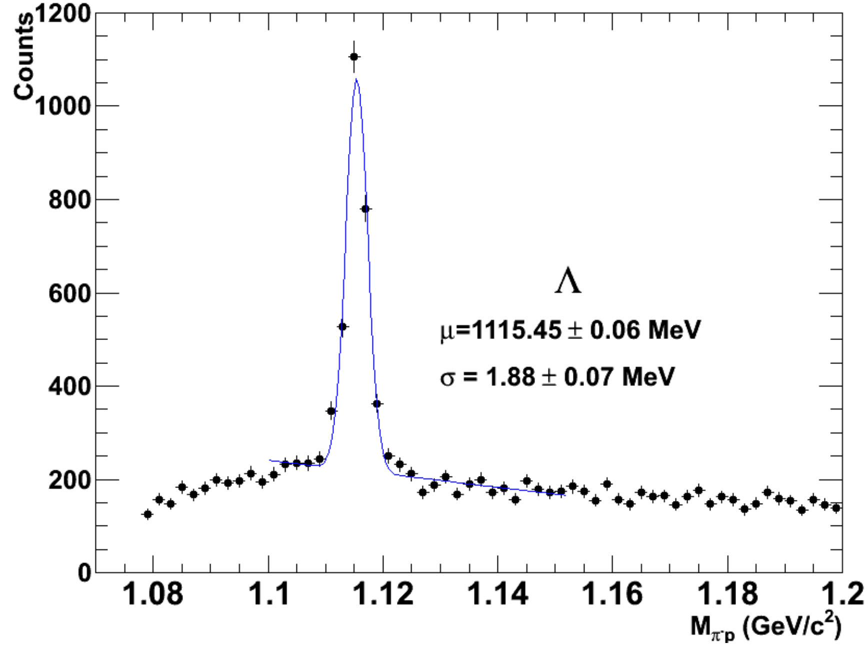
Strangeness enhancement in lead-lead collisions

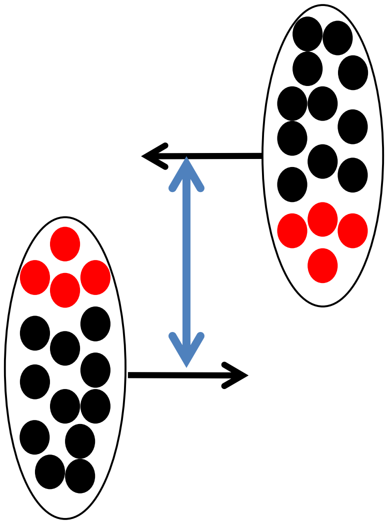
- Analysis of large event samples from lead collisions
- Find number of K_s, Λ, anti-Λ
- Calculate particle yields
- Calculate strangeness enhancement taking into account particle yields in proton collisions



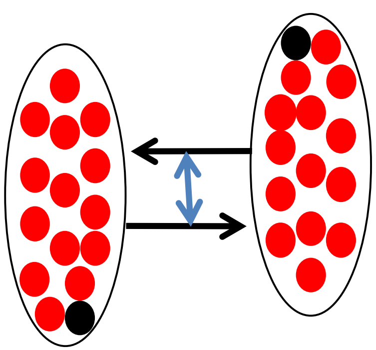


- Continuum : irreducible background due to random combinations of $\pi^+\pi^-$ or $\pi^- p$
- Fit curves to background (2nd degree polynomial) and peak (gaussian)
- Find number of K_s, Λ, anti-Λ after background subtraction

Geometry of a Pb-Pb collision



- Peripheral collision
  - Large distance between the centres of the nuclei
  - Small number of participants
  - Few charged particles produced (low multiplicity)

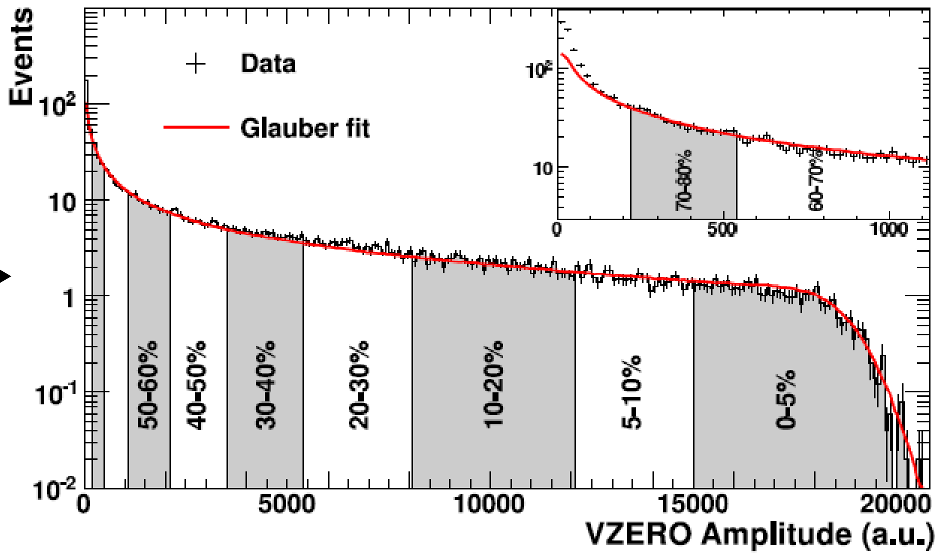


- Central collision
  - Small distance between the centres of the nuclei
  - Large number of participants
  - Many charged particles produced (high multiplicity)

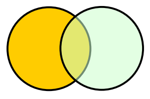
Centrality of Pb-Pb collisions

Distribution of the signal amplitude of V0 (plastic scintillators)

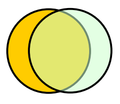
red line : described by model (Glauber)



Centrality	$dN_{ch}/d\eta$	$\langle N_{part} \rangle$	$(dN_{ch}/d\eta)/(\langle N_{part} \rangle/2)$
0%–5%	1601 ± 60	382.8 ± 3.1	8.4 ± 0.3
5%–10%	1294 ± 49	329.7 ± 4.6	7.9 ± 0.3
10%–20%	966 ± 37	260.5 ± 4.4	7.4 ± 0.3
20%–30%	649 ± 23	186.4 ± 3.9	7.0 ± 0.3
30%–40%	426 ± 15	128.9 ± 3.3	6.6 ± 0.3
40%–50%	261 ± 9	85.0 ± 2.6	6.1 ± 0.3
50%–60%	149 ± 6	52.8 ± 2.0	5.7 ± 0.3
60%–70%	76 ± 4	30.0 ± 1.3	5.1 ± 0.3
70%–80%	35 ± 2	15.8 ± 0.6	4.4 ± 0.4



peripheral collisions



central collisions

Strangeness enhancement calculation

Yield : number of particles produced per interaction = Nparticles(produced)/Nevents

Efficiency = Nparticles(measured)/Nparticles(produced)*

Yield = Nparticles(measured)/(efficiency x Nevents)

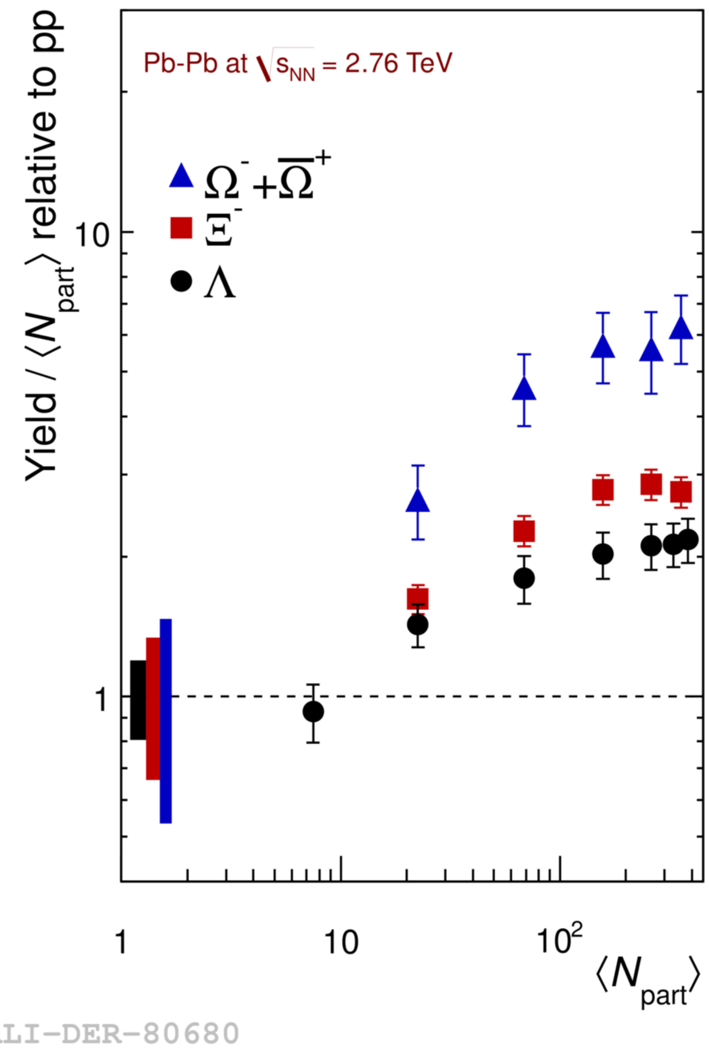
K_s-Yield (pp) = 0.25 /interaction ; Λ-Yield(pp) = 0.0617 /interaction ; $\langle N_{part} \rangle = 2$ for pp

Strangeness enhancement: the particle yield normalised by the number of participating nucleons in the collision, and divided by the yield in proton-proton collisions**

*assumption on efficiency values : to match yields in Analysis Note
Measurement of Ks and Λ spectra and yields in Pb–Pb collisions at $\sqrt{s_{NN}}$=2.76 TeV with the ALICE experiment

*pp yields at 2.76 TeV from interpolation between 900 GeV and 7 TeV
Analysis Note "Ks, Λ and antiΛ production in pp collisions at 7 TeV"

Strangeness enhancement : one of the first signals of QGP



Enhancement increases with number of strange quarks in the hadron (Ω has 3, Ξ has 2, Λ has 1)