„Was die Welt im Innersten zusammenhält“,
… the bound states of the strong interaction

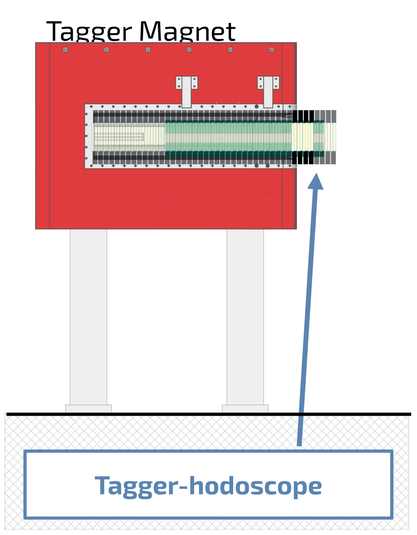
- **How does the strong interaction produce its massive bound states from almost massless quarks?**
- **Which (exotic) bound states do exist?**

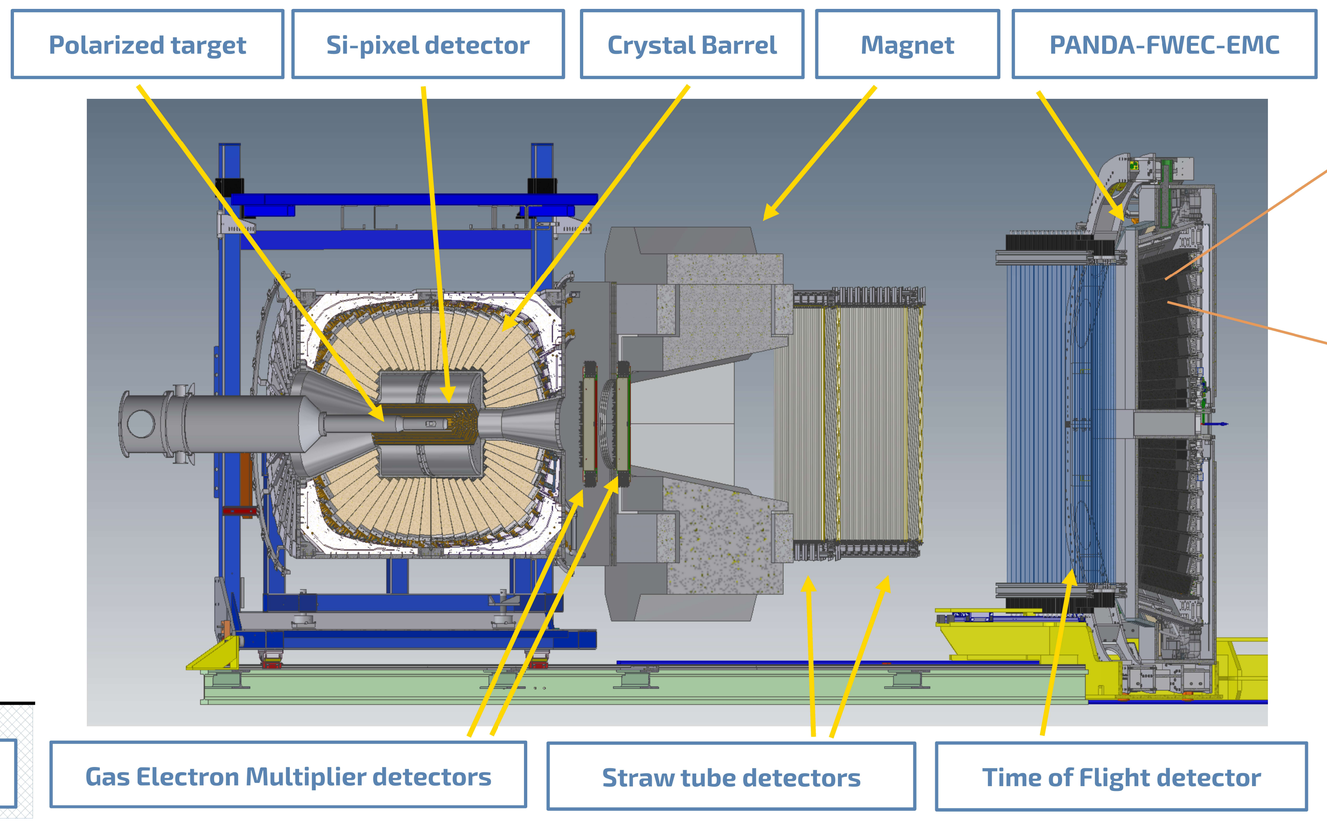
2+2+5 MeV → 938 MeV

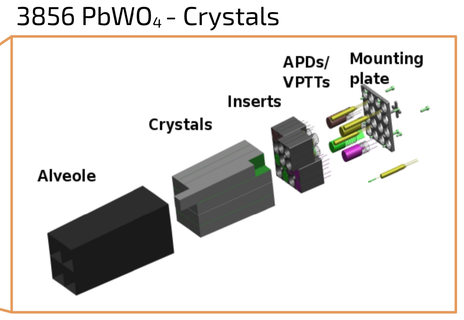
INSIGHT: A new experiment at ELSA

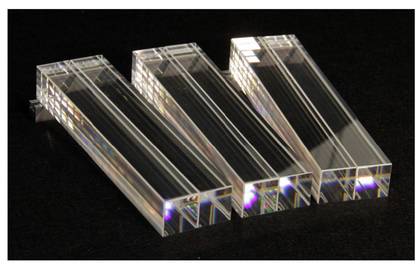
ELSA = University accelerator with the highest energy in Europe!
Polarised beam and polarised target

@ELSA INSIGHT
Investigation of the strong interaction in the light flavor sector









➔ **A world-wide unique experiment**

- ⬌ **Unique combination of an almost complete angular coverage for high resolution photon measurements, charged particle detection and the ability to perform measurements with polarised beam and target**
- ⬌ **Strange quark sector ⬌ field remained in a standstill for decades – due to missing precise data**
- ⬌ **Do exotic states such as pentaquarks also exist in the strange quark sector?**

Non-strange baryons:

Gain a complete picture of the N*, Δ* - baryon spectrum:

- **Polarized photoproduction off the polarized proton and neutron!**
- **Multi-meson photoproduction**

Strange baryons (Λ*, Σ*):

„… the field is starved for data“ (PDG'2024)

Established resonances remained the same for more than 30 years!

Interesting exception: Two pole structure of the Λ(1405)

⬌ **Not even all states of the first excitation band known!**

- **Spectrum and properties of Λ*, Σ***
- **Multi-quark states? molecules? 2-pole structures?**

e.g: $\gamma p \rightarrow K^+\Lambda^* \rightarrow K^+\Sigma^0\pi^0$, $\gamma p \rightarrow K^+\Sigma^* \rightarrow K^+\Lambda\pi^0$, ...

$\gamma p \rightarrow K^+\Lambda^* \rightarrow K^+\Sigma^0\pi^0$ (isospin selective)