

# Double- $\Lambda$ -Hypernuclei at $\bar{P}$ ANDA

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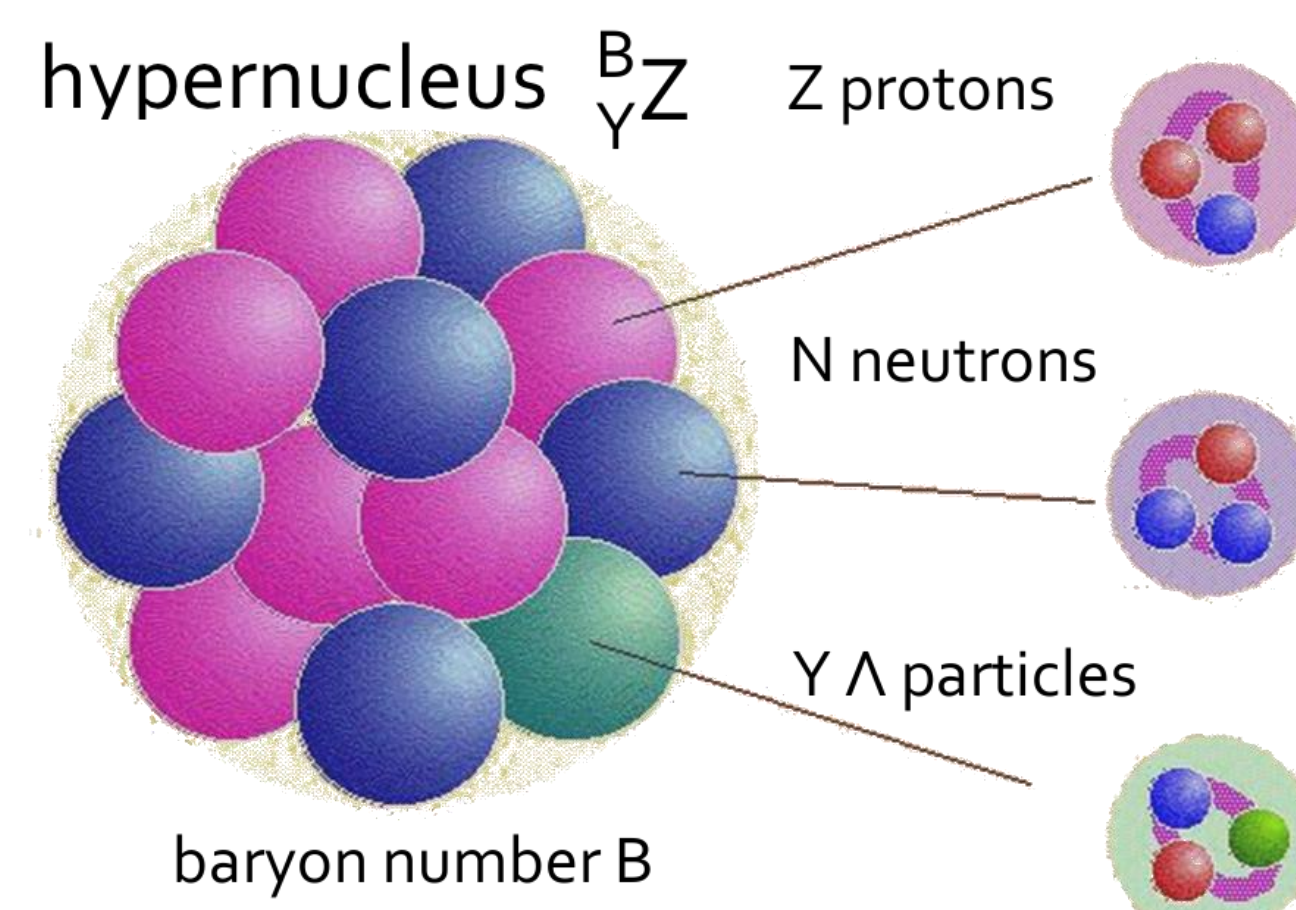
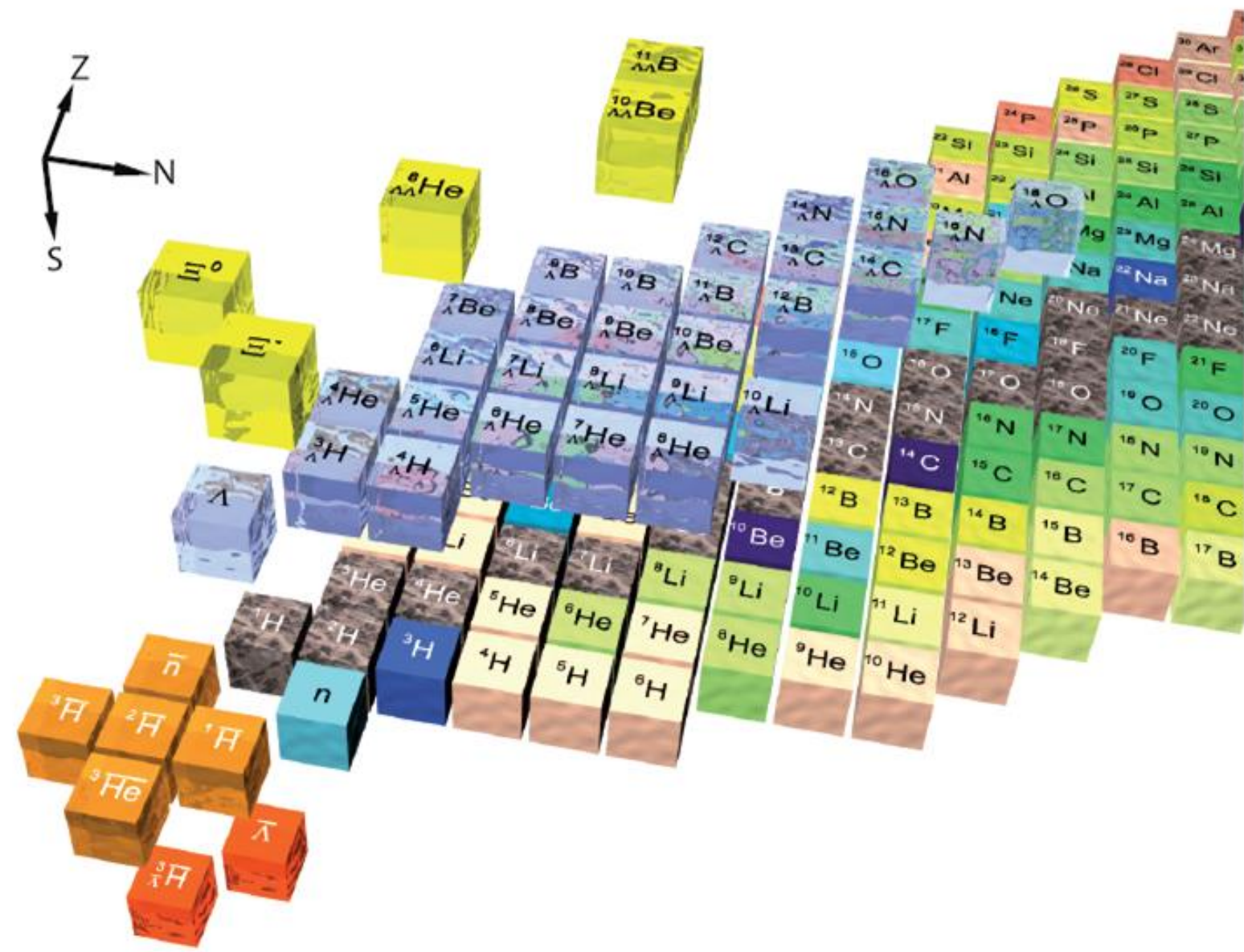


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## Nuclear chart

Present knowledge on  $S=-1$  nuclei (blue) and  $S=-2$  nuclei (yellow). Only very few individual events of double hypernuclei have been detected and identified so far.



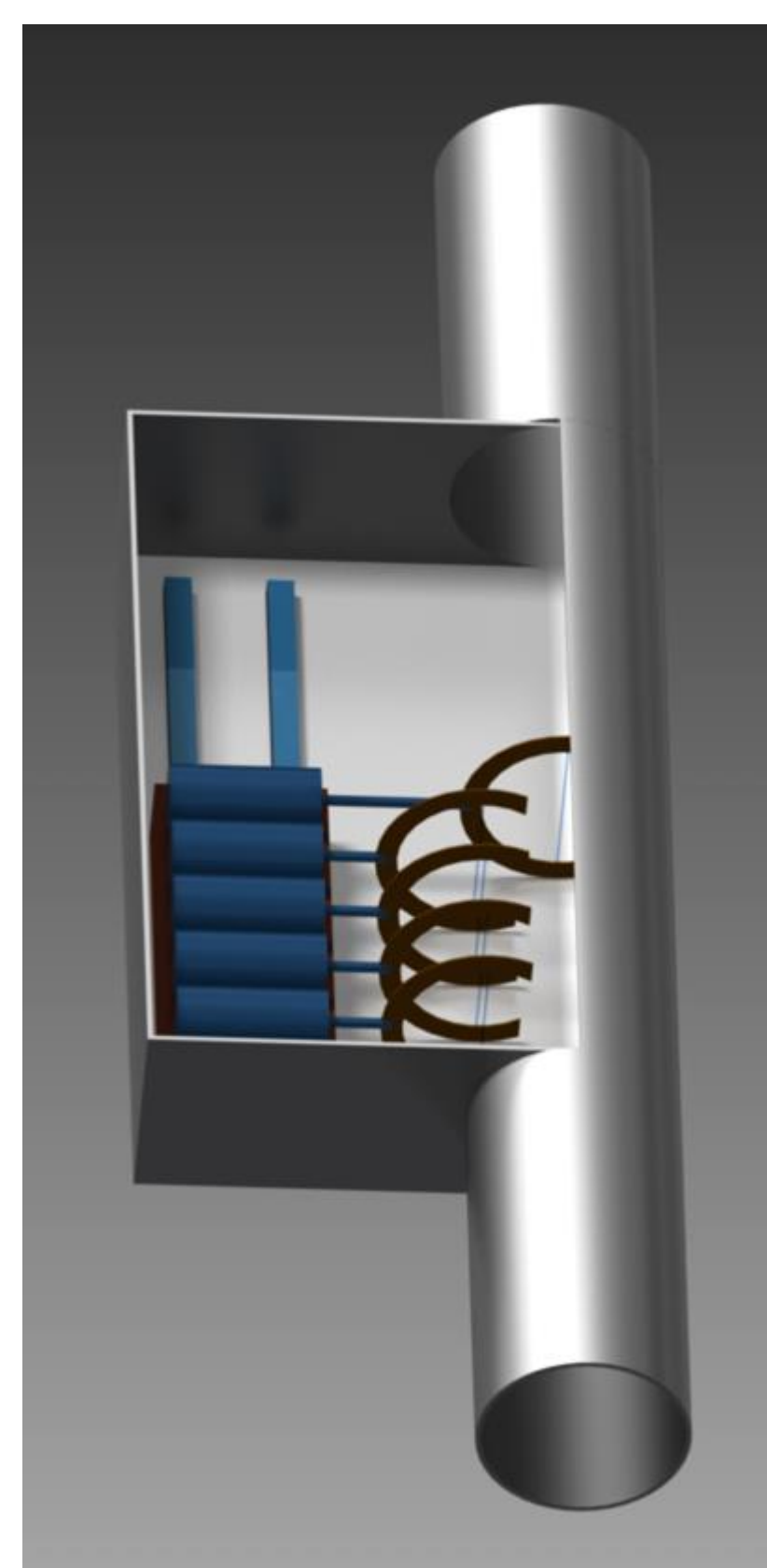
up quark

down quark

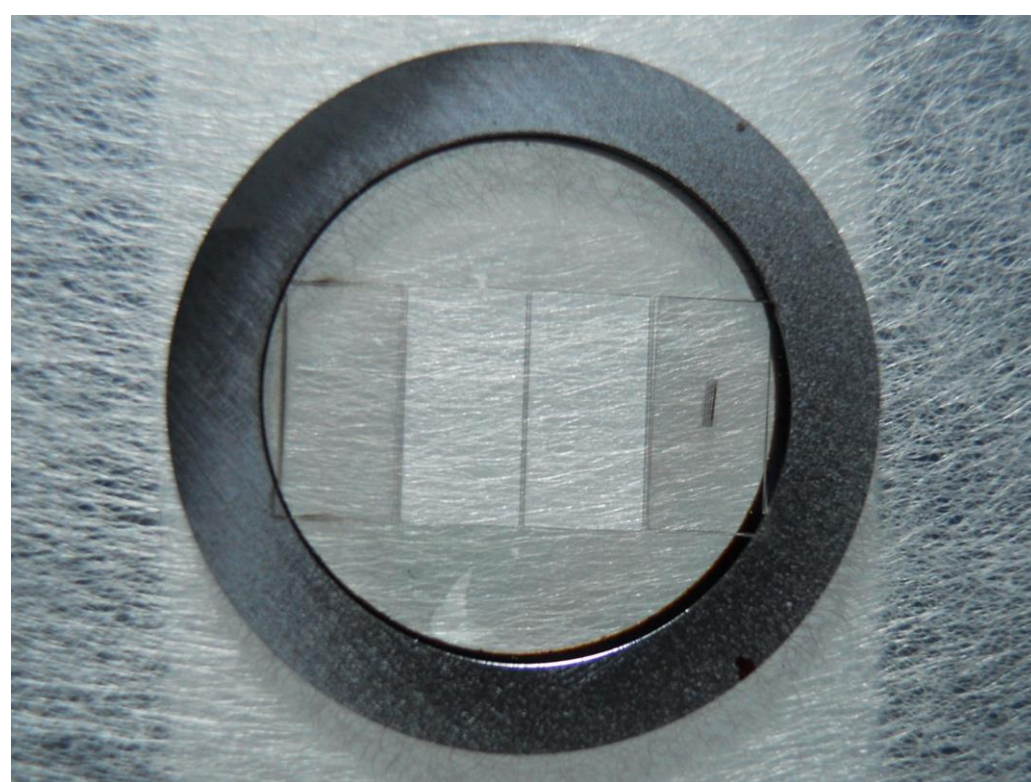
strange quark

## Structure of a $\Lambda$ -hypernucleus

Nuclei are composed of protons and neutrons. Including a particle with strange quarks as a  $\Lambda$ -hyperon they are called hypernuclei.



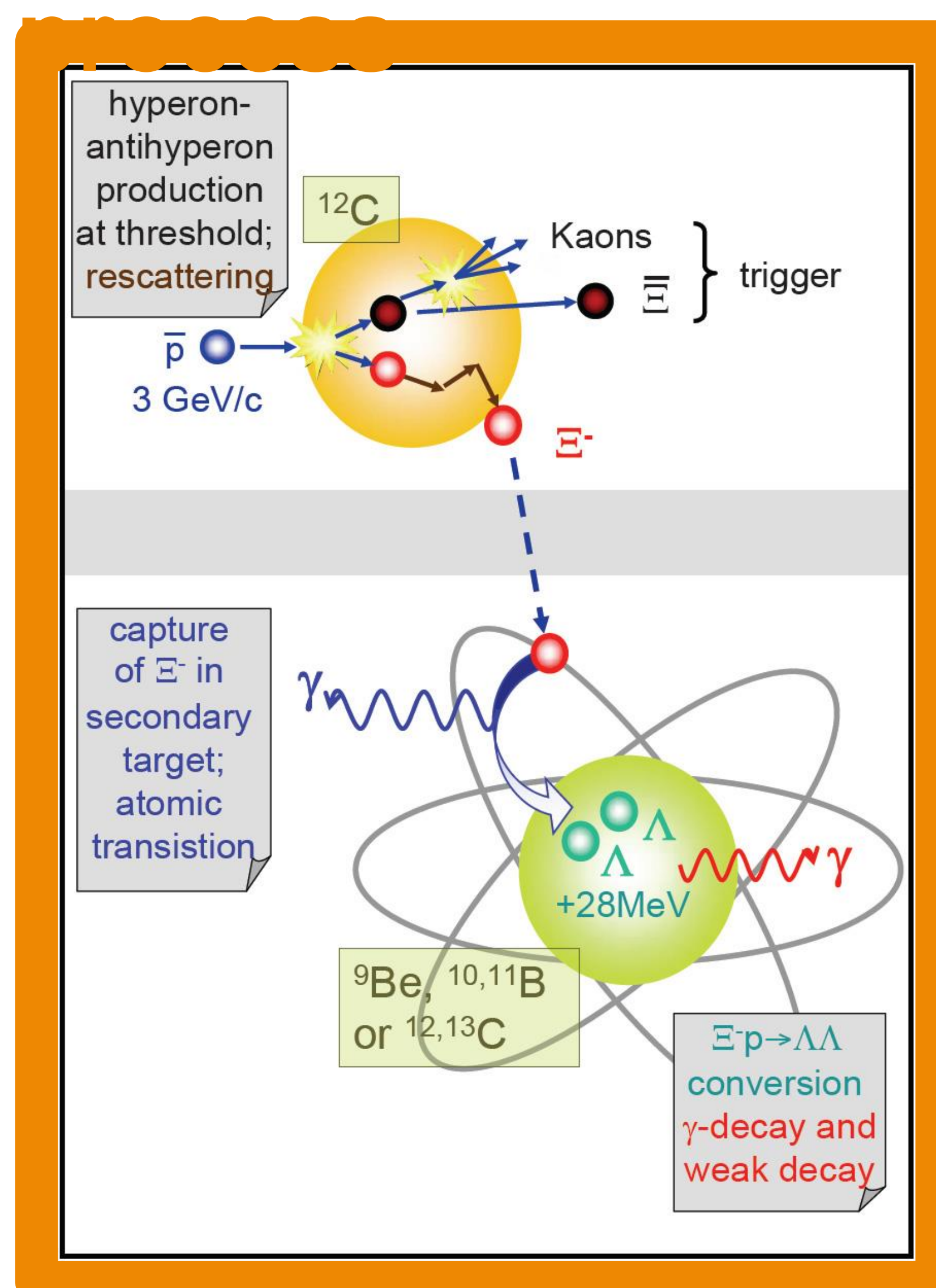
## Primary target



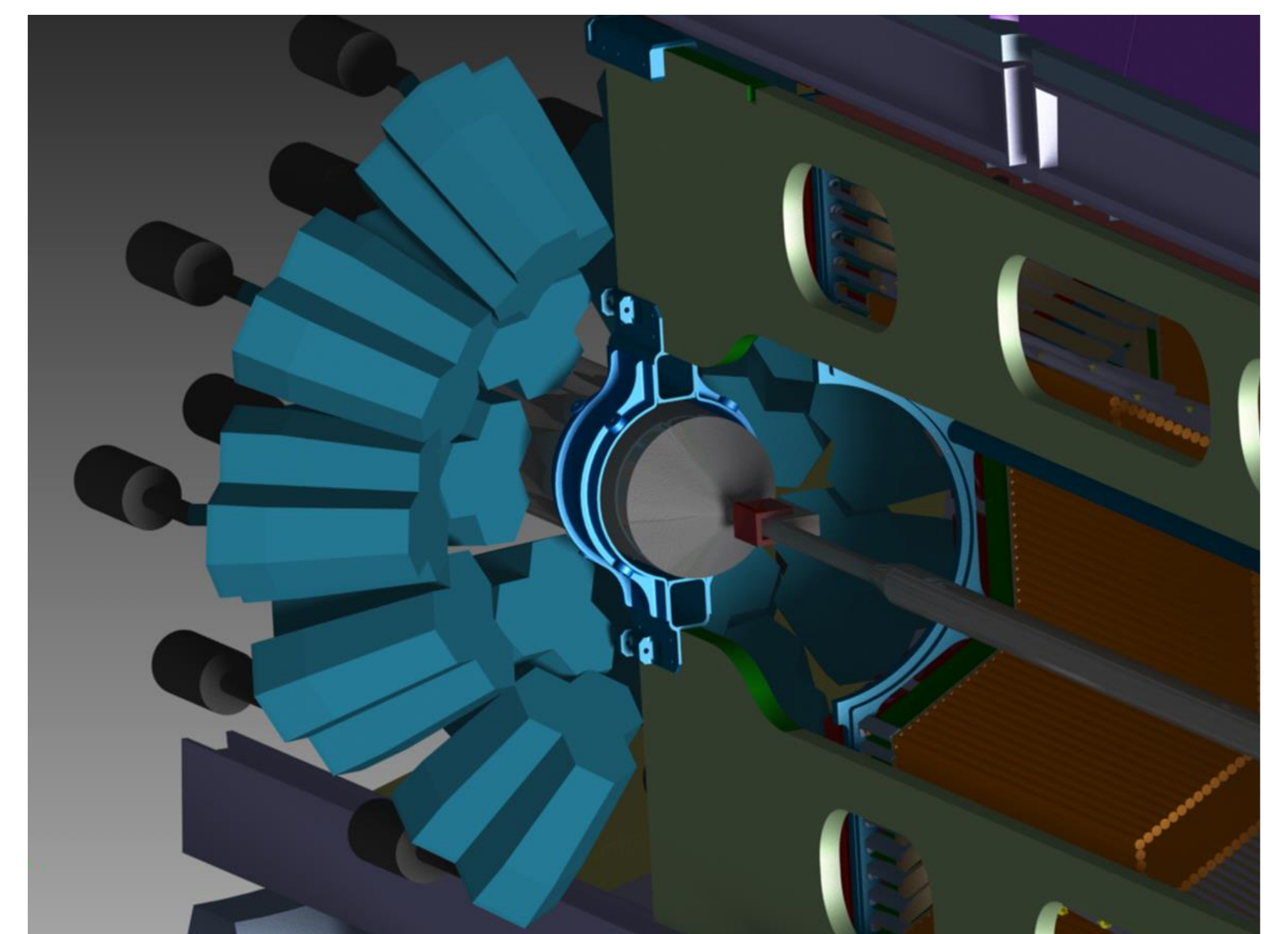
Picture of the existing carbon fiber prototype (thickness 3  $\mu\text{m}$ , width 100  $\mu\text{m}$ )

Design of a steerable and exchangeable primary target using piezo motors

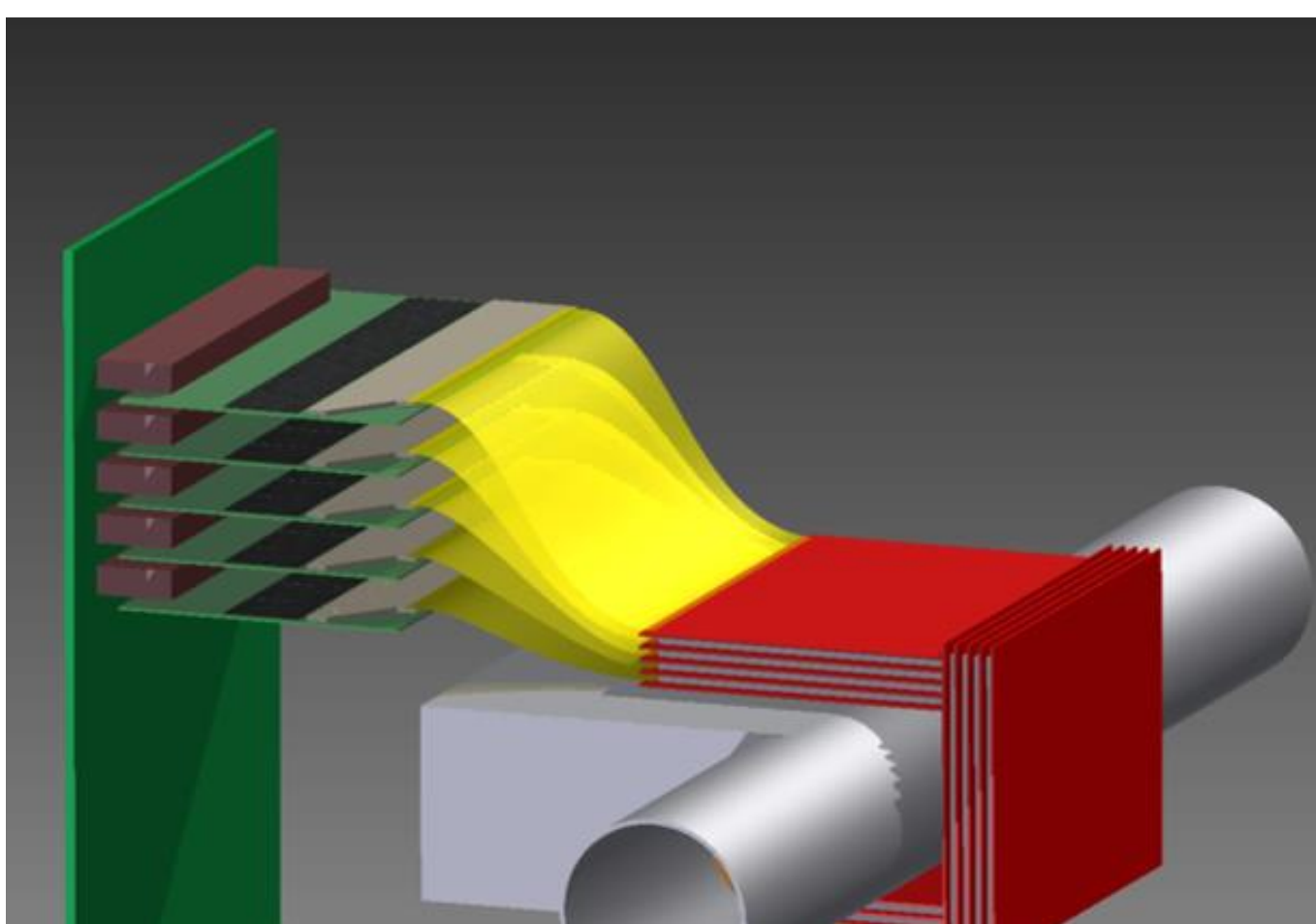
## Production



## Hypernuclear detector setup in PANDA

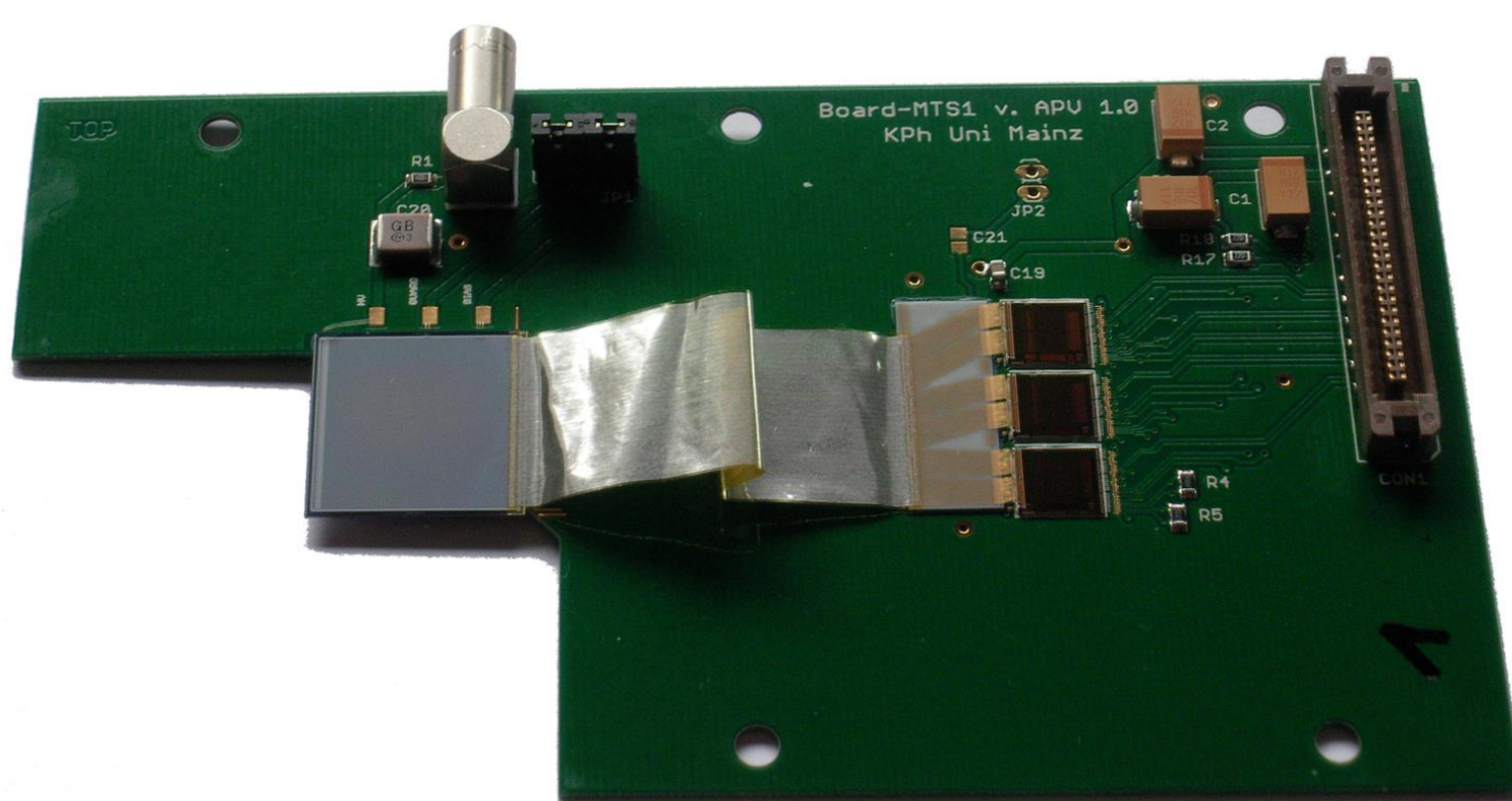


## Secondary target



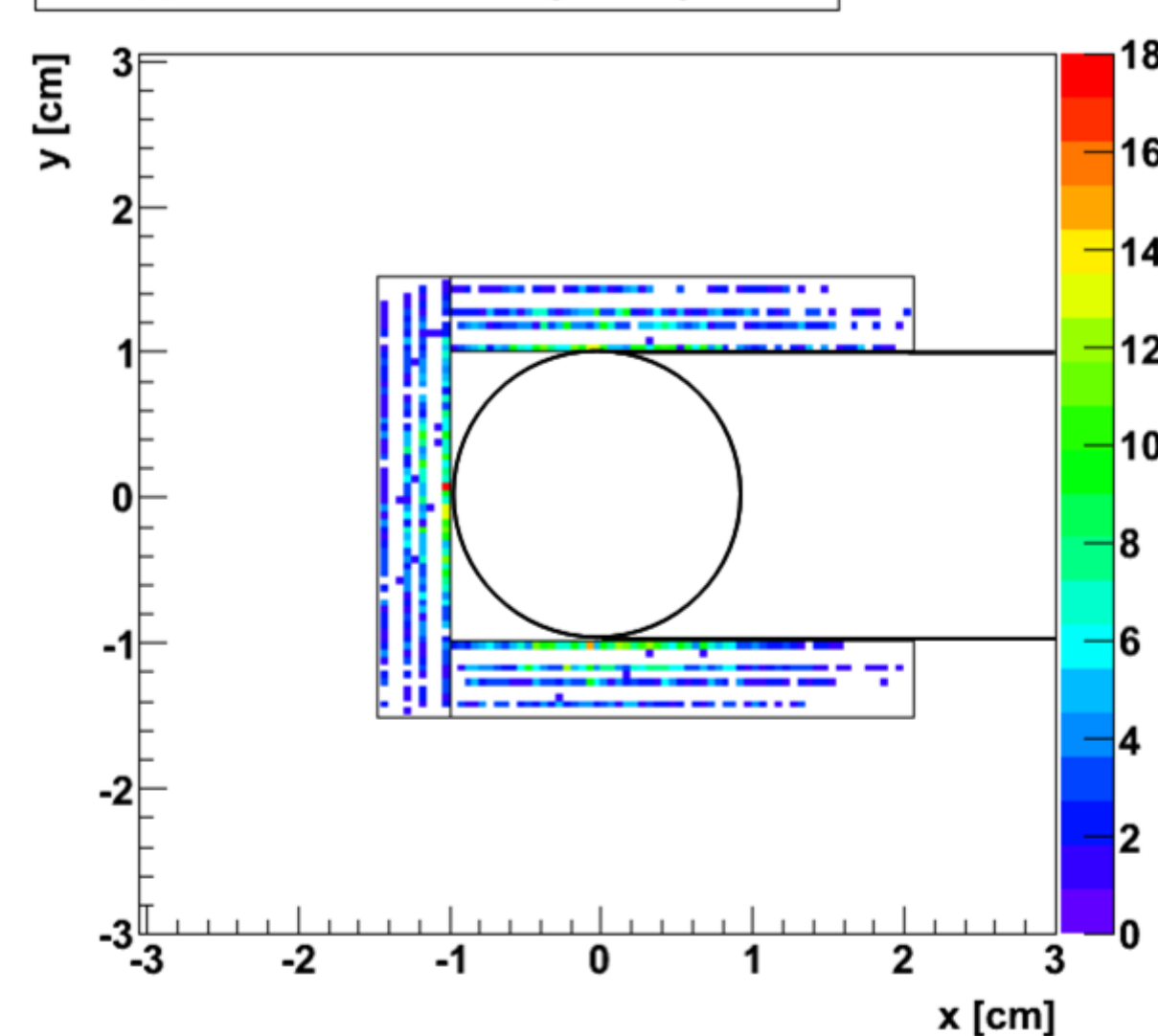
Design of the secondary target and its readout electronics

Testboard for Al-polyimide cable performance (thickness Al 10  $\mu\text{m}$ , PI 10  $\mu\text{m}$ )

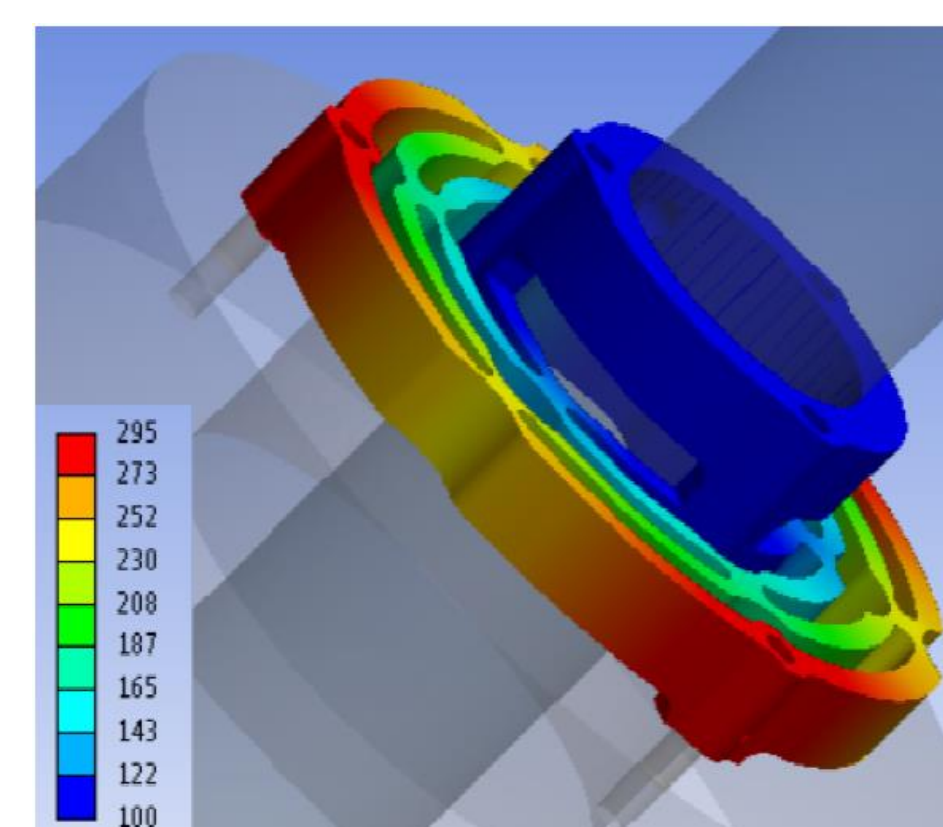


Simulation of stopped  $\Xi^-$  in beryllium absorbers of 1 mm thickness

Stopped  $\Xi^-$  in absorber layers, xy view

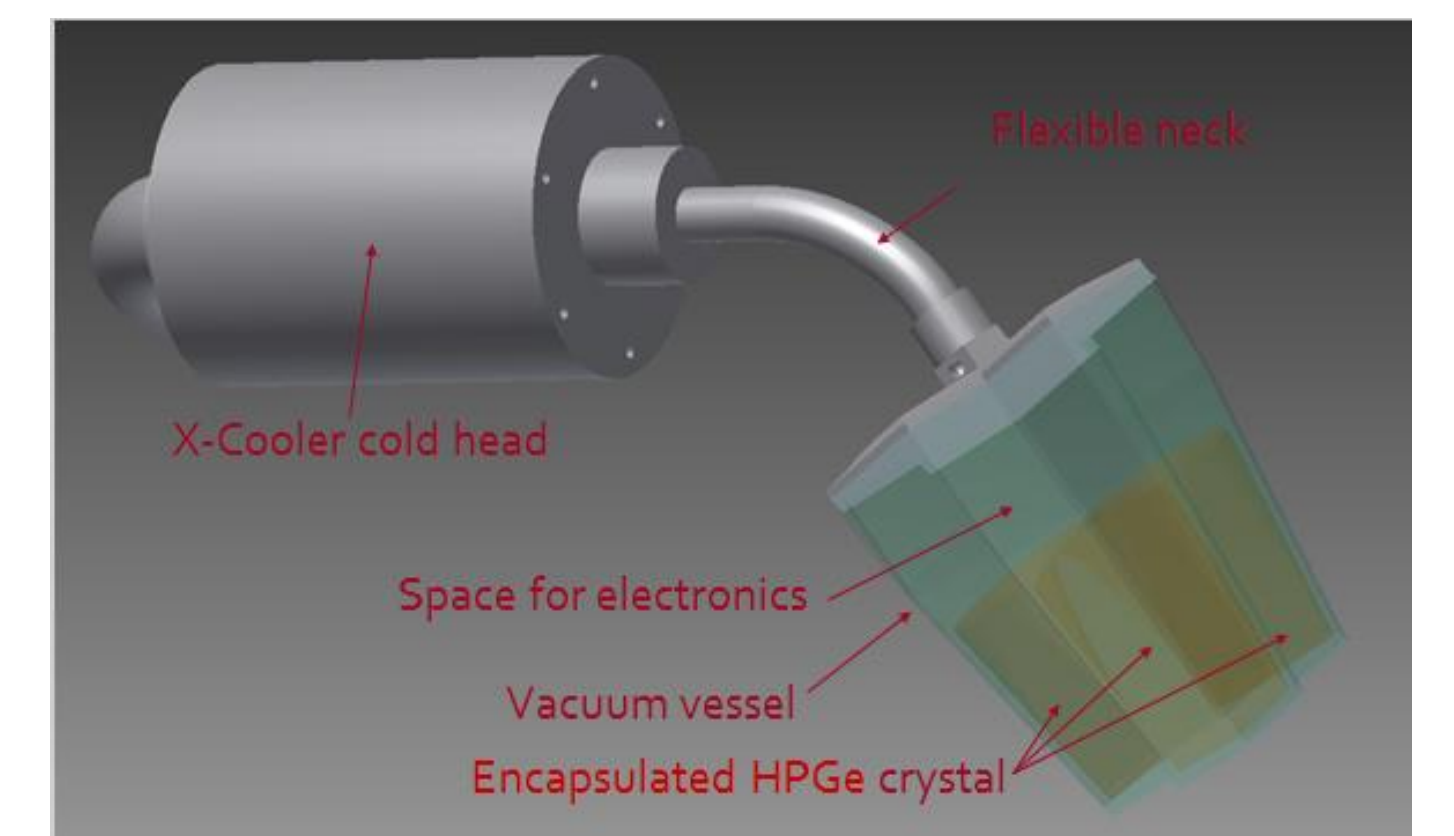


Simulation to improve the thermal capabilities of the germanium detector



## Germanium detector

Design of a detector with three crystals



Pictures of the germanium detector prototype

