

# DCS: Status of the Hypernuclei Setup

Michael Bölting

$\bar{P}$ ANDA Collaboration Meeting 18/1  
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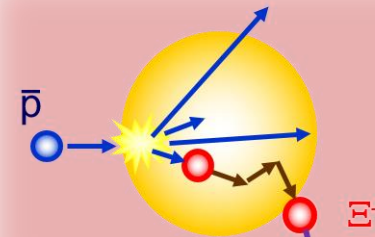


**HIM** HELMHOLTZ  
Helmholtz-Institut Mainz

# Production of hypernuclei

$\Xi^-$  production:  
 $pN \rightarrow \Xi^- \bar{\Xi}$

rescattering in  
**primary target**  
 nucleus



deceleration in  
 secondary target

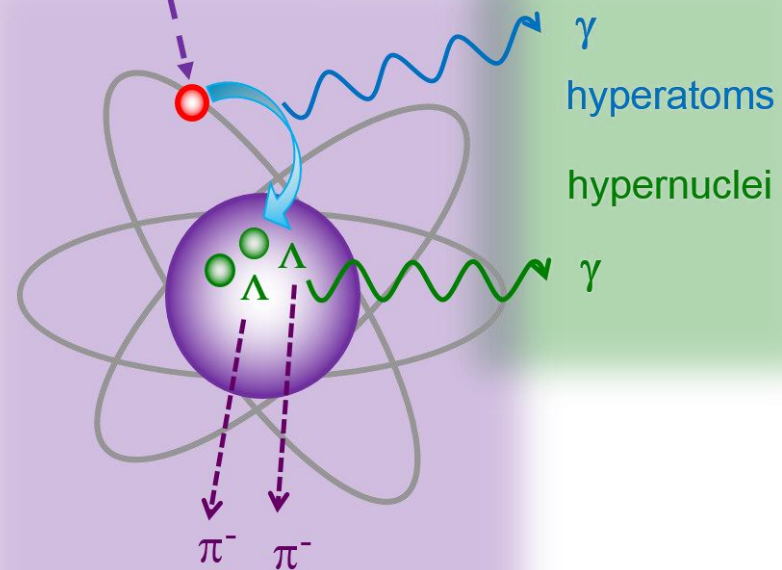
capture of  $\Xi^-$

atomic cascade of  $\Xi^-$

$\Xi^- p \rightarrow \Lambda \Lambda$  conversion  
 fragmentation  
 $\rightarrow$  excited  $\Lambda \Lambda$ -nucleus

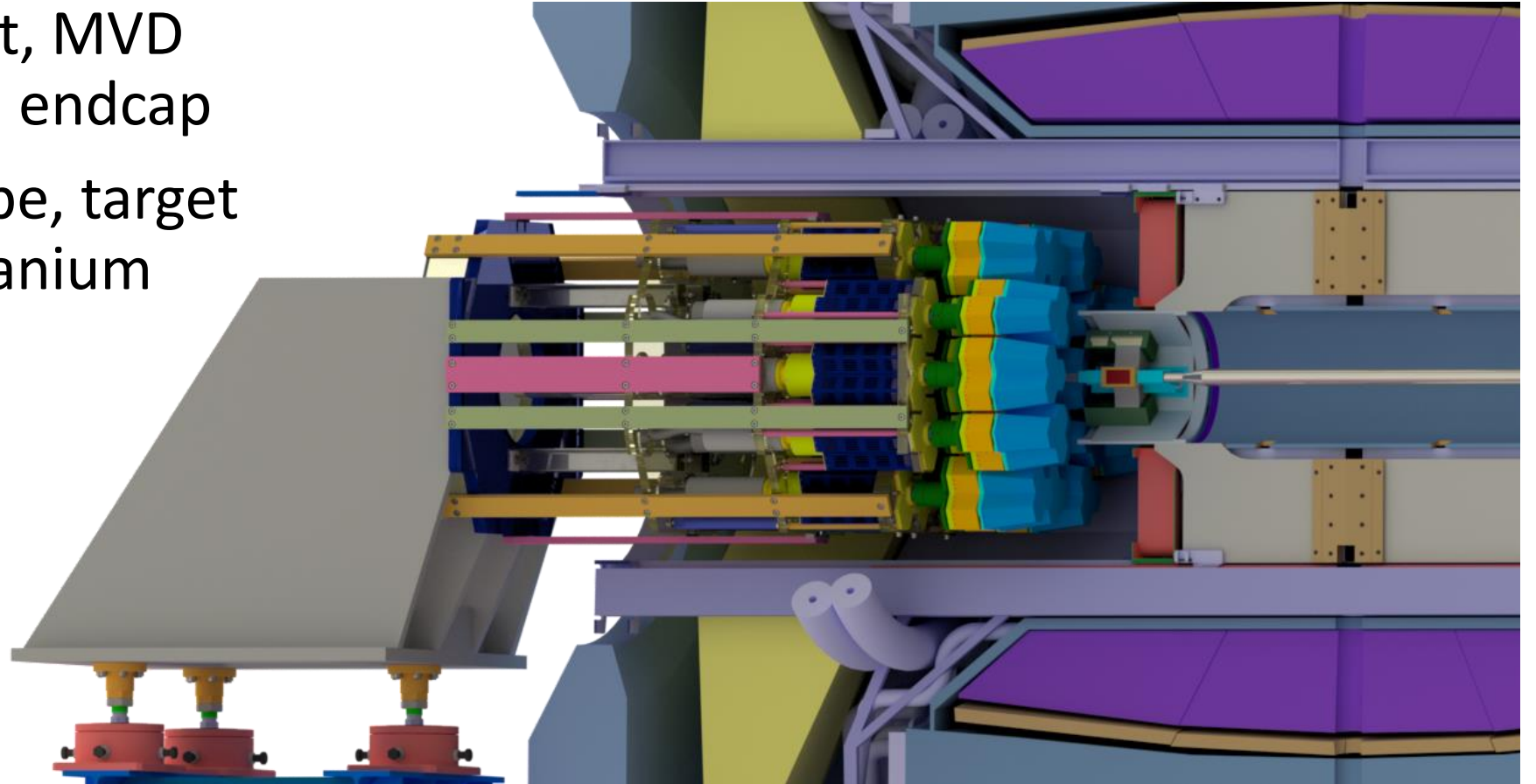
$\gamma$ -deexcitation of  $\Lambda \Lambda$   
 hypernuclei

weak pionic decay

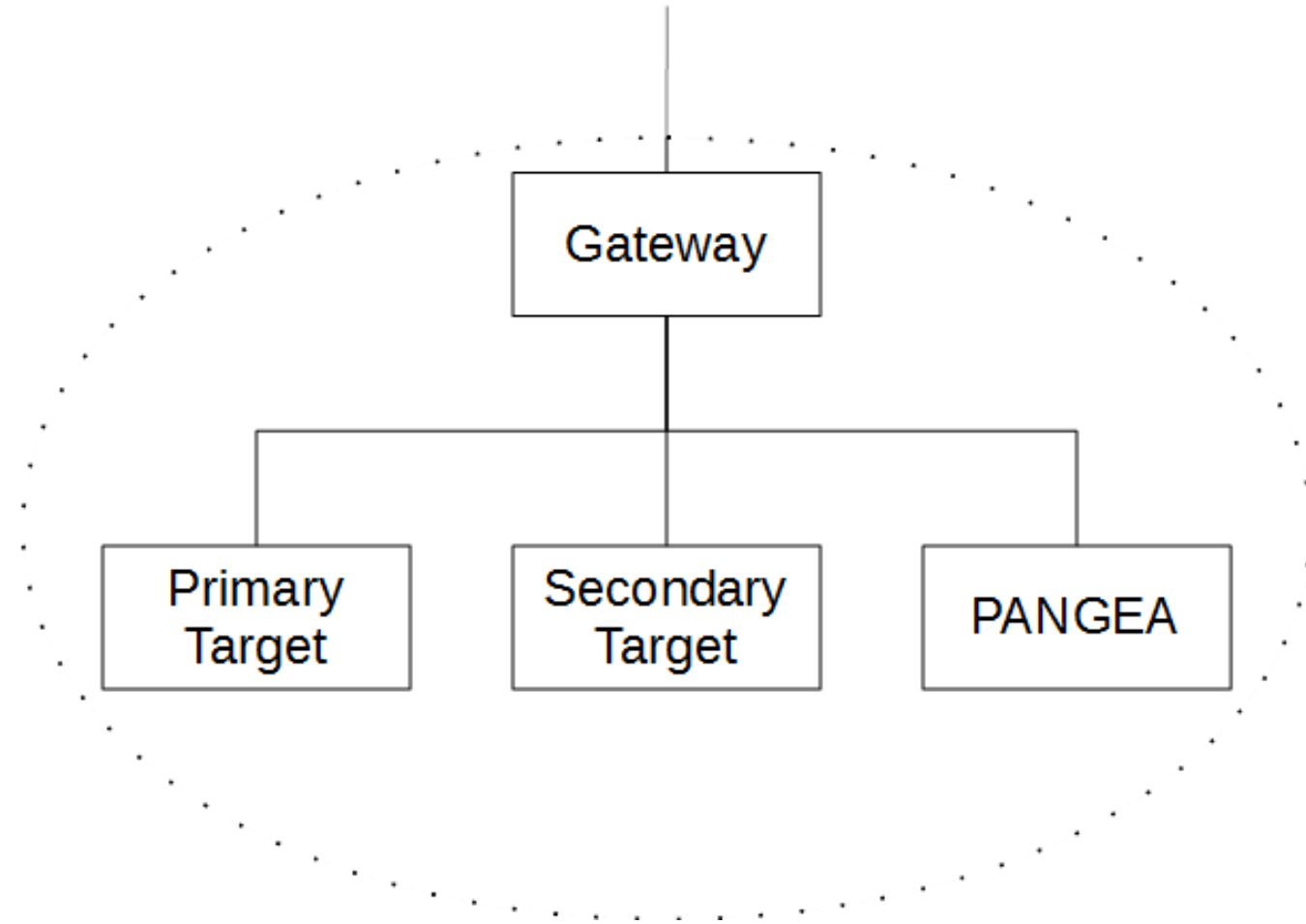


# Setup for the hypernuclei experiment

- Remove target, MVD and backward endcap
- New beam pipe, target system, germanium array

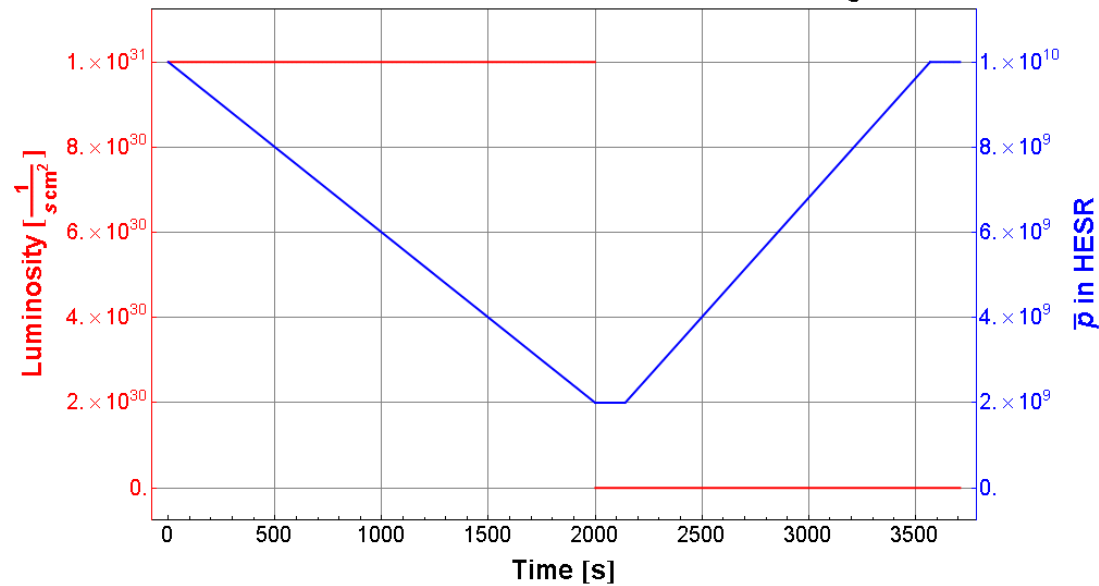


# Hypernuclei Setup - DCS Overview



# DCS of Primary Target?

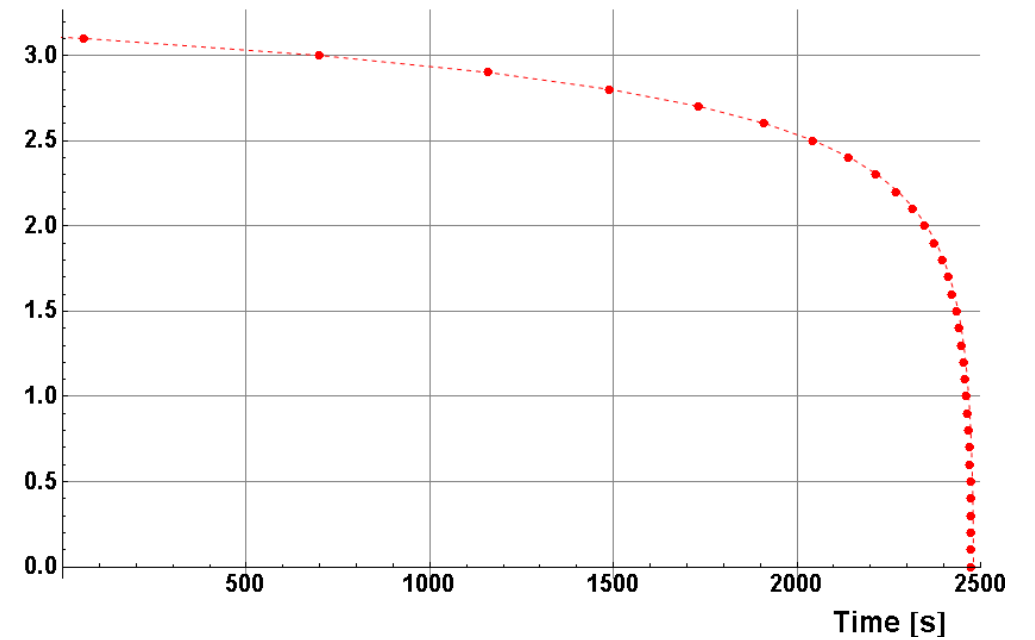
$\bar{p}$  in HESR curve for  $t_{\text{exp}} = 2000$  s,  
 $r_{\text{tar}} = 5 \mu\text{m}$ , Reaction rate =  $4. \times 10^6 \frac{1}{\text{s}}$



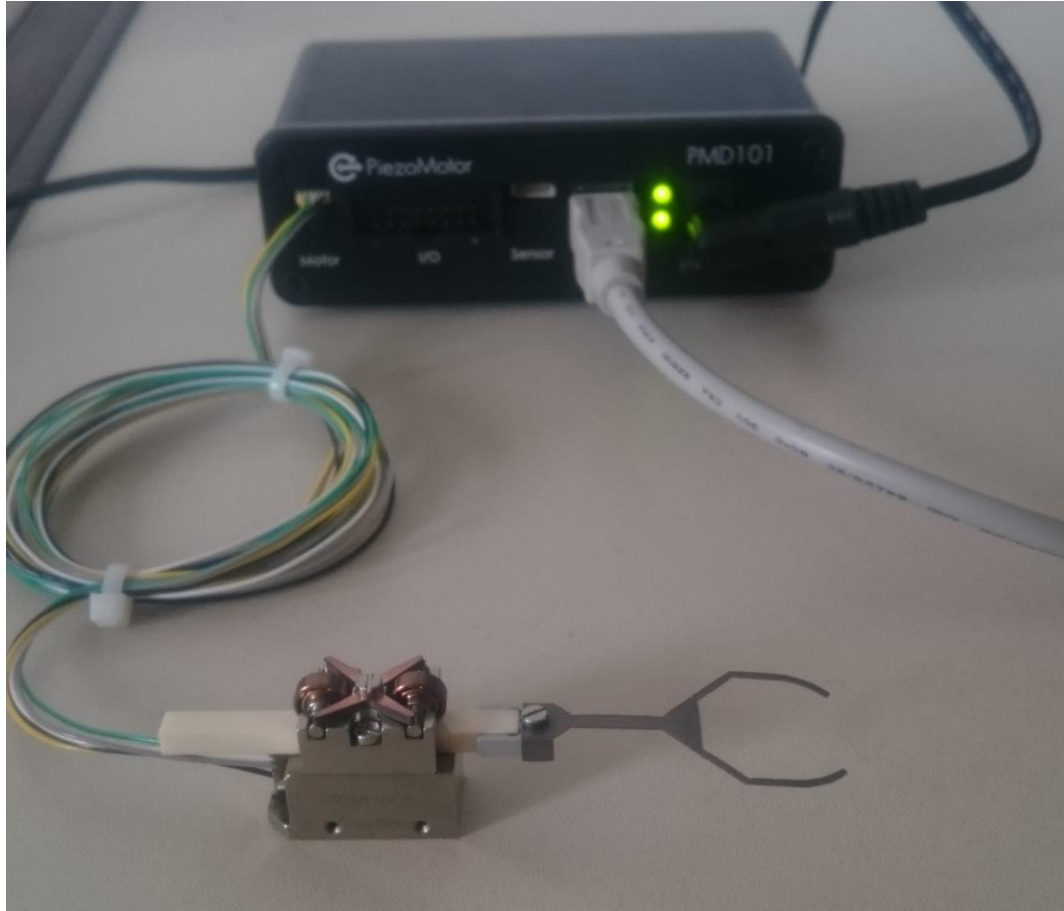
Target position during experiment,

$r_{\text{tar}} = 5 \mu\text{m}$ , Reaction rate =  $4. \times 10^6 \frac{1}{\text{s}}$

Target position [mm]

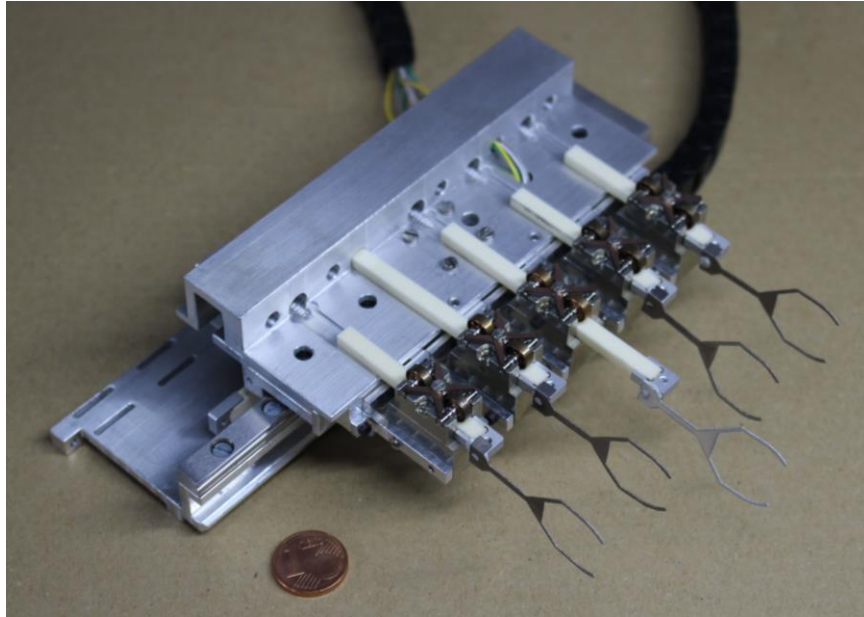


# Primary Target Motors

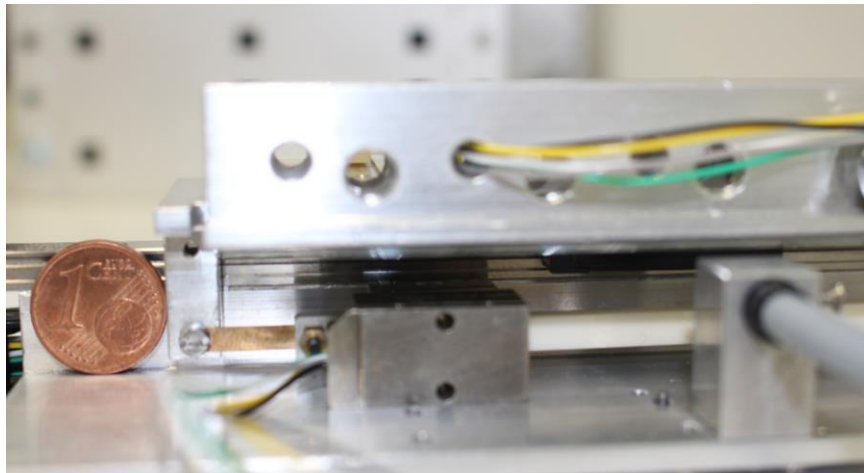


- Host: Beaglebone Black with debian 8.4
- Running EPICS from Repositories
- Controlled via streamdev

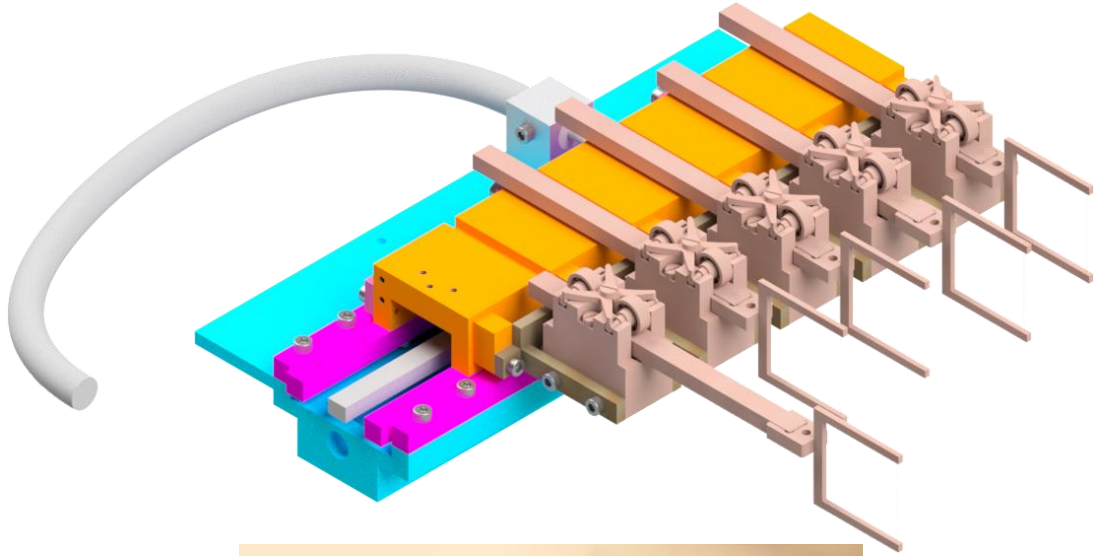
# Primary Target



- requires Luminosity feedback for positioning
- Sledge motor problematic - hardware redesign



# New Hardware



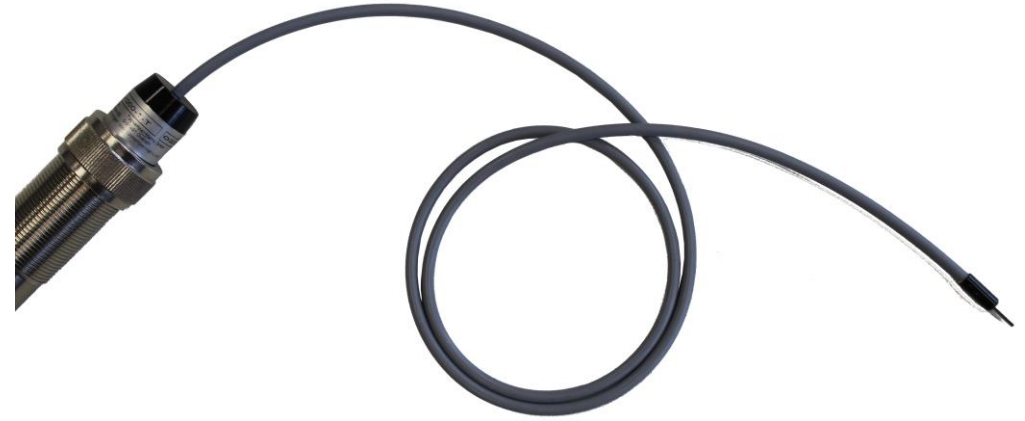
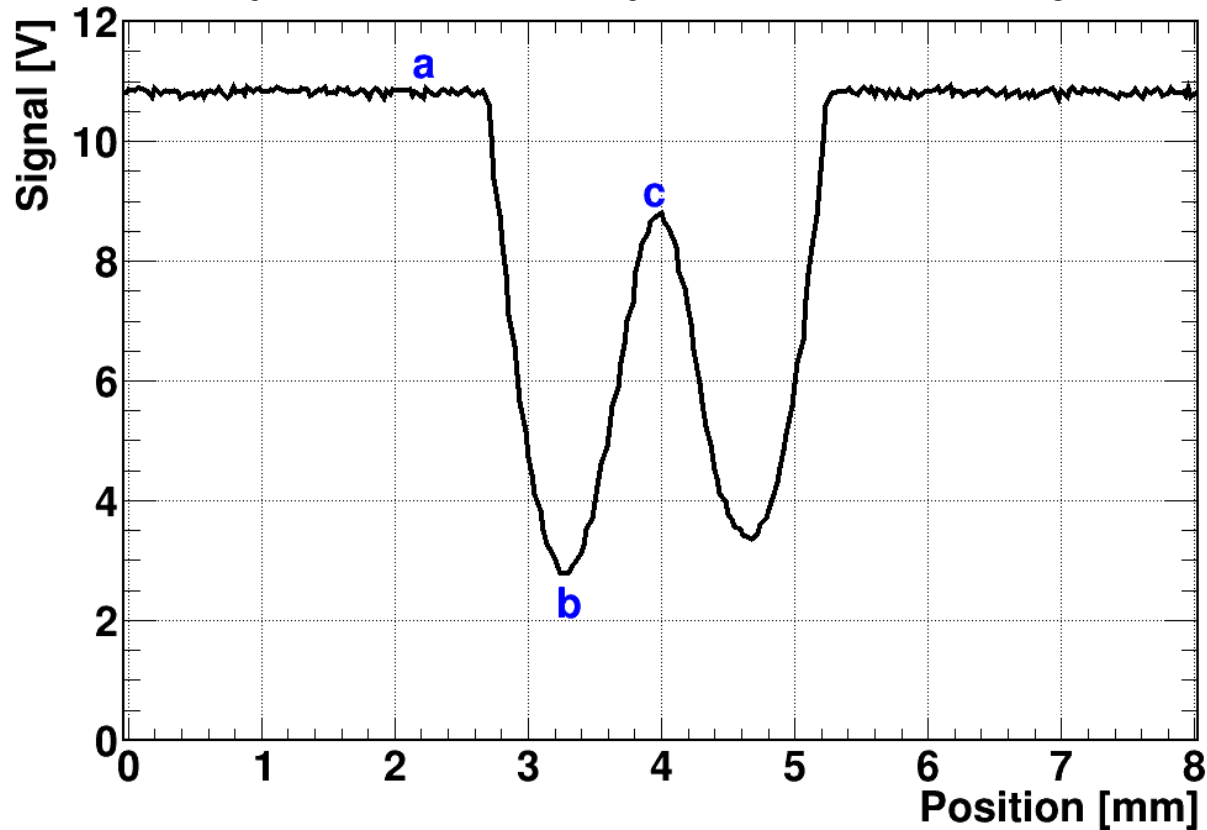
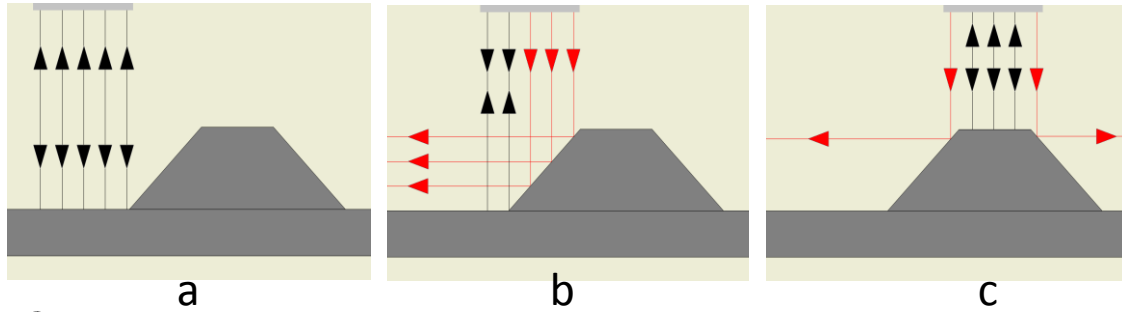
Ordered, but still missing:

- Sledge motor
  - Rails
- 
- No working setup



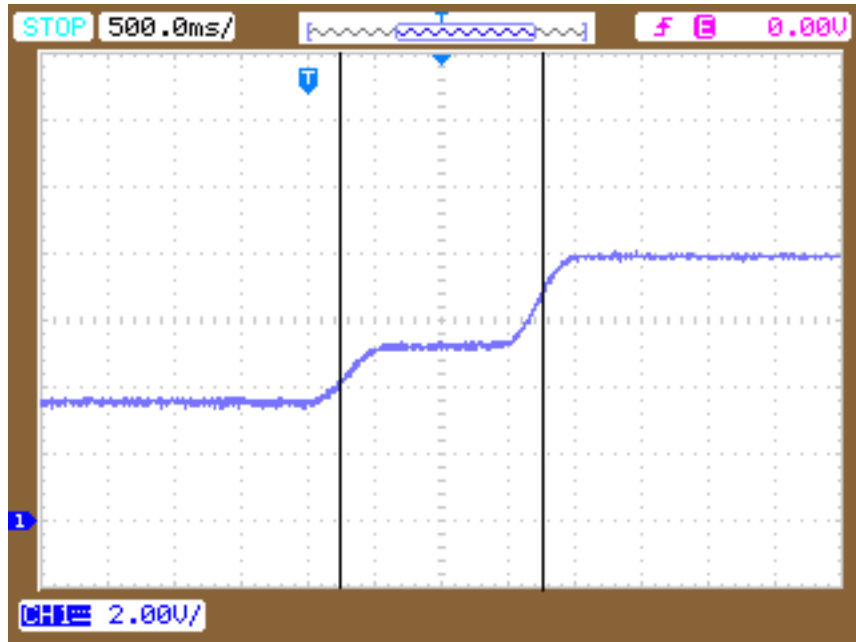


# Position Control



- c position:  $\pm 50 \mu\text{m}$
- Precision of approach unknown
- Up to 15 m light guide

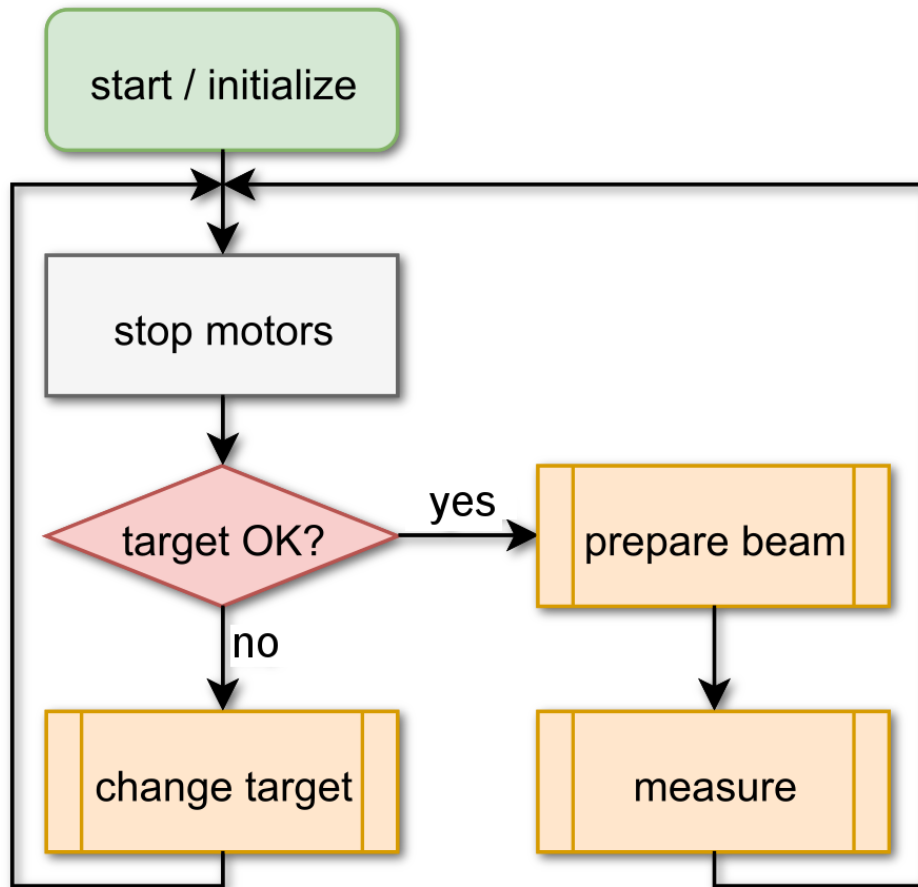
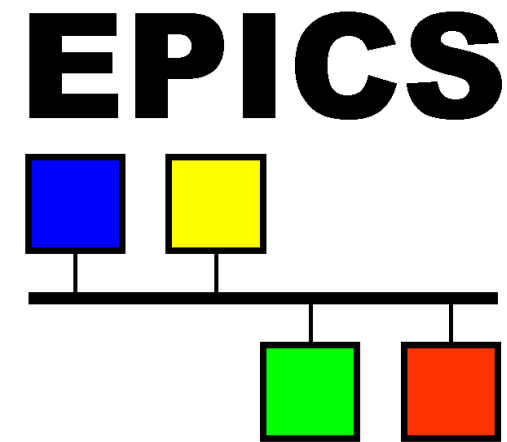
# Z Movement Hardware Interlock



- Distinguishable Position using BeagleBone Black ADC
- Read via devgpio
- Hardware Interlock possible



# Primary Target DCS



- Target exchange
- Luminosity controlled Movement (simulated)
- Integrated z Position control
- Essentially working

# Summary

- Hypernuclei DCS 3 parts
  - Primary Target: Prototype done (no Luminosity feedback)
  - Secondary Target: similar Hardware to MVD strip part
  - Germanium Array: Development ongoing