



# 11B Analysis with S455 Setup

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R3B Collaboration  
Meeting  
30. Nov. 2020

Setup and Detectors

Particle Identification

$^{12}\text{C}(p,2p)^{11}\text{B}$  reaction

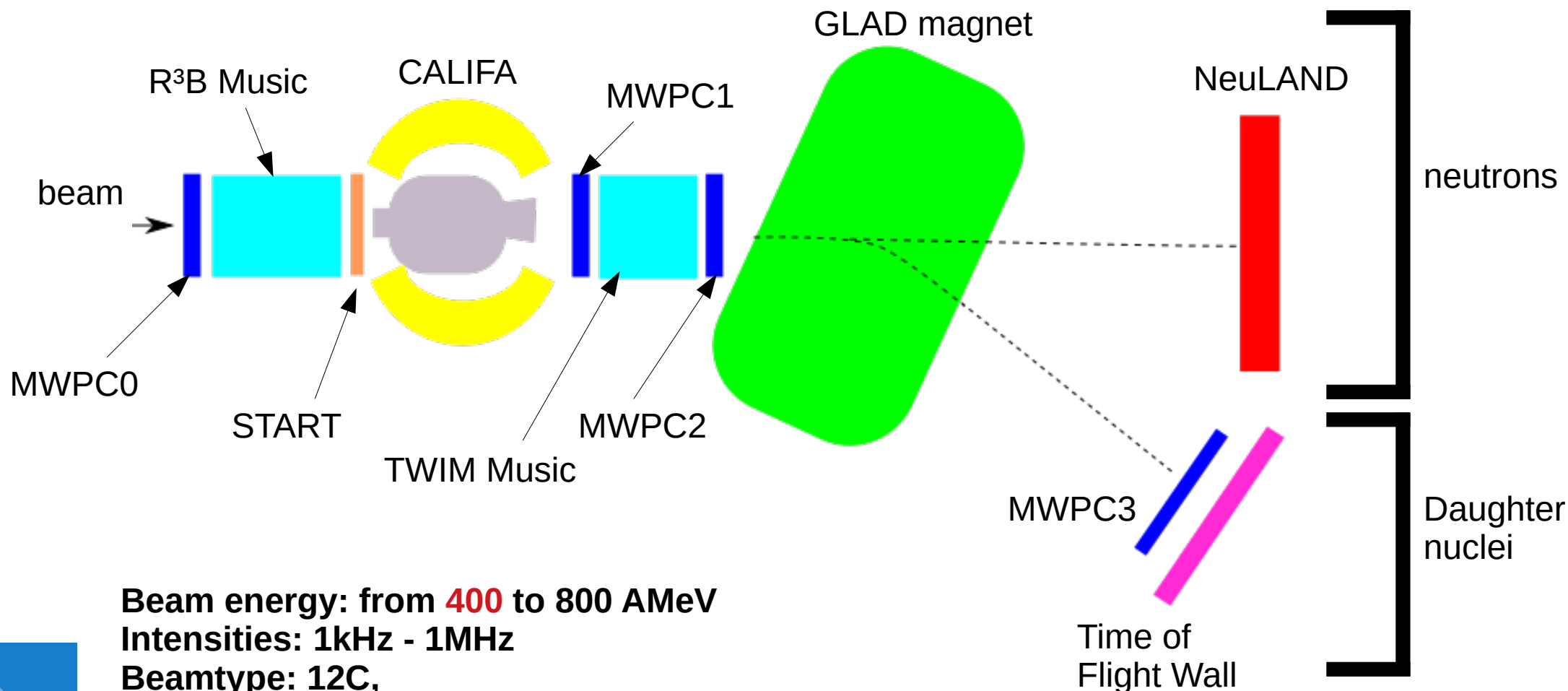
Summary & Outlook

Supported by BMBF 05P15WOFNA and 05P19WOFN1.

The results presented here are based on the experiment s444/s473, which was performed at the beam line/infrastructure Cave C at the GSI Helmholtzzentrum für Schwerionenforschung, Darmstadt (Germany) in the frame of FAIR Phase-0.



# The S455 Setup (February 2020)



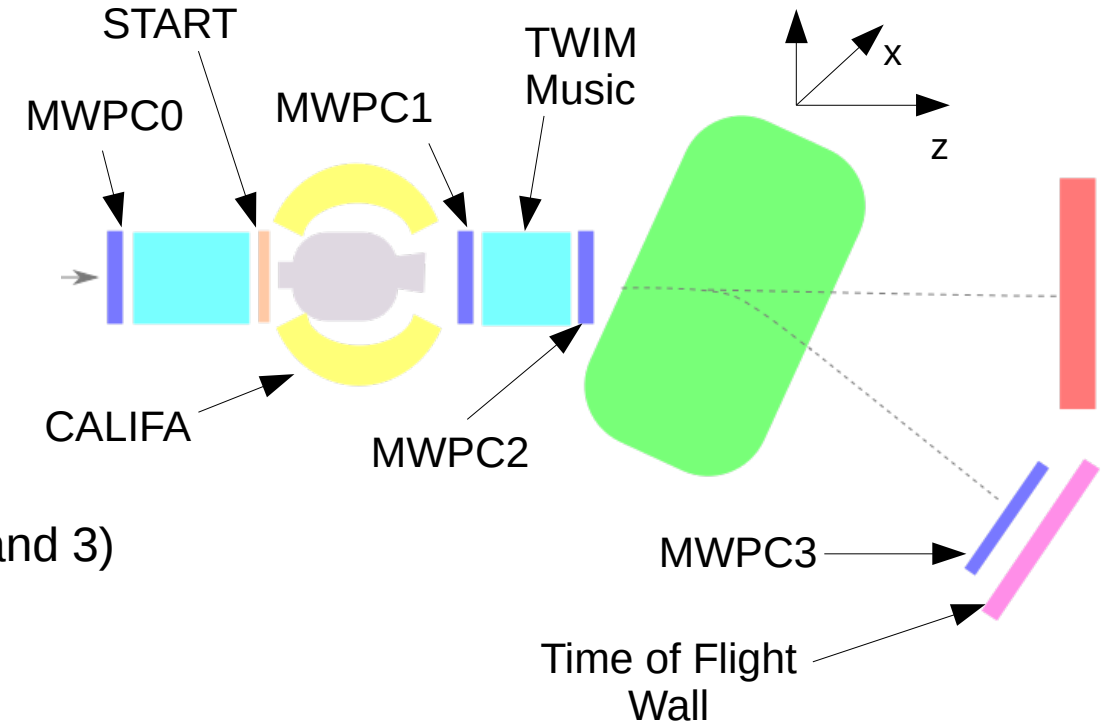
Beam energy: from **400** to 800 AMeV  
Intensities: 1kHz - 1MHz  
Beamtype: 12C,  
Target: C, **CH2**

$$B\rho = \frac{\beta \gamma M}{q}$$

Time of Flight Measurement: Start to TOFW

Flight-path Reconstruction: Tracking Detectors (MWPC1, 2 and 3)

Charge Measurement : TWIM Music





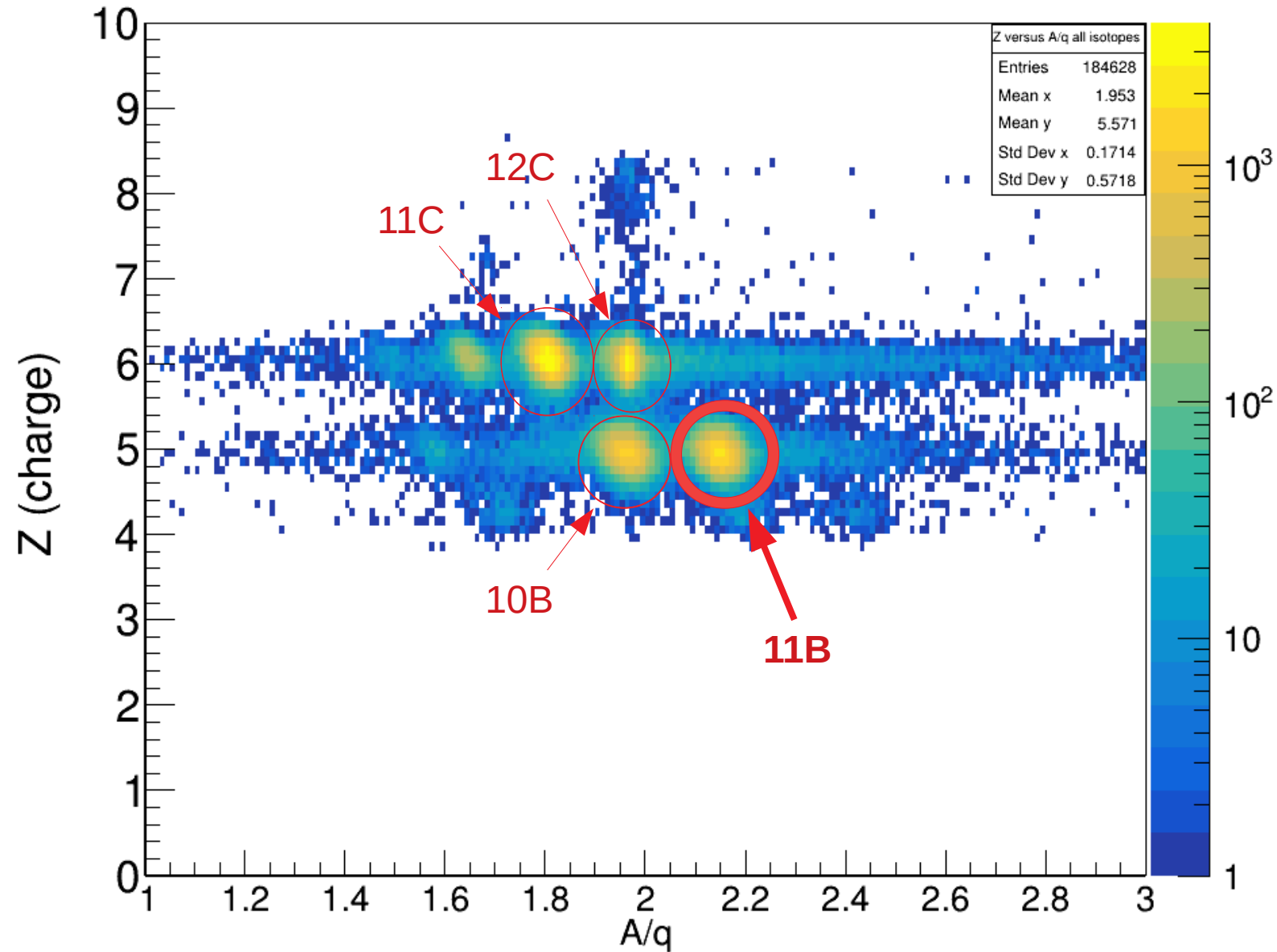
Known:

- 

Diagram illustrating the geometry of a laser beam and its interaction with a target. The diagram shows a coordinate system with a horizontal axis labeled  $z_T$  and a vertical axis labeled  $\alpha G$ . A red line represents the beam path, starting from a source at  $z_T$  and passing through points  $z_{M1}$ ,  $z_{M2}$ , and  $z_{M3}$ . A vertical line represents the target plane at  $z_{M2}$ . The beam is deflected by an angle  $\alpha G$ . The distance from the source to the target plane is labeled  $L_{eff}$ . The distance from the target plane to the point  $z_{M3}$  is labeled  $d2$ . The distance from the source to the point  $z_{M3}$  is labeled  $d1$ . A yellow box highlights the intersection point where  $d1 = d2$ .

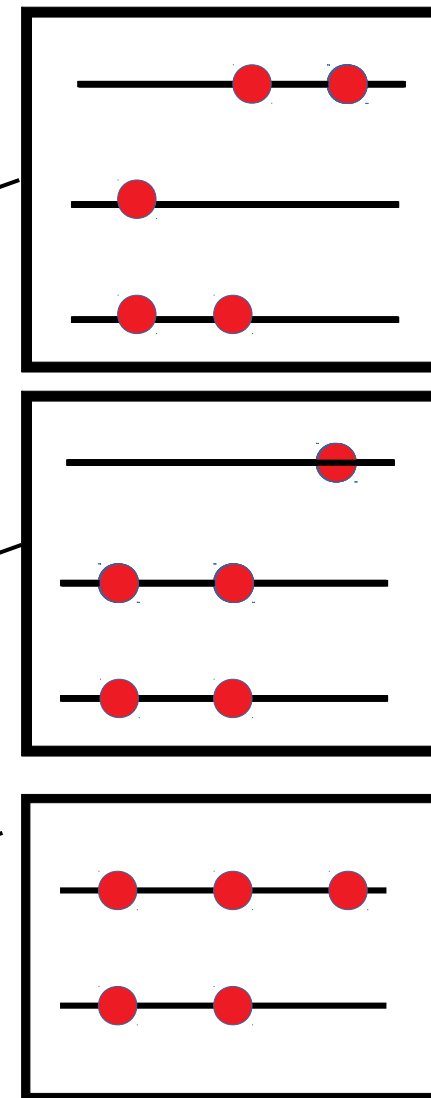
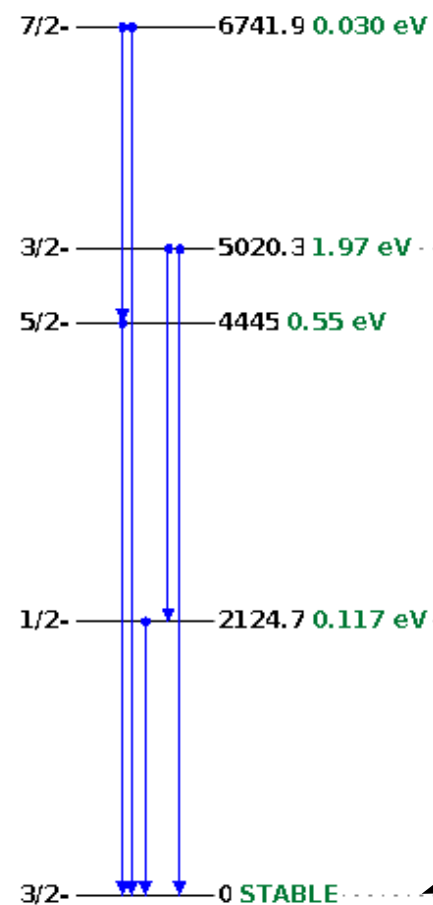
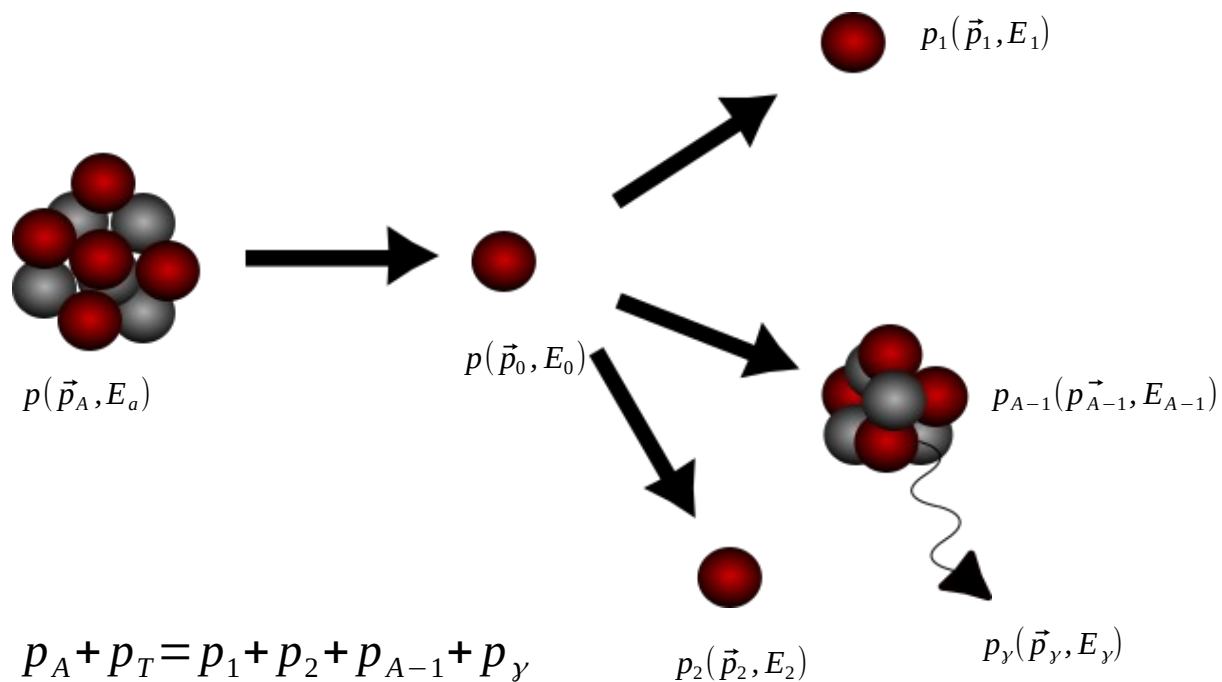


# Charge versus $A/q$



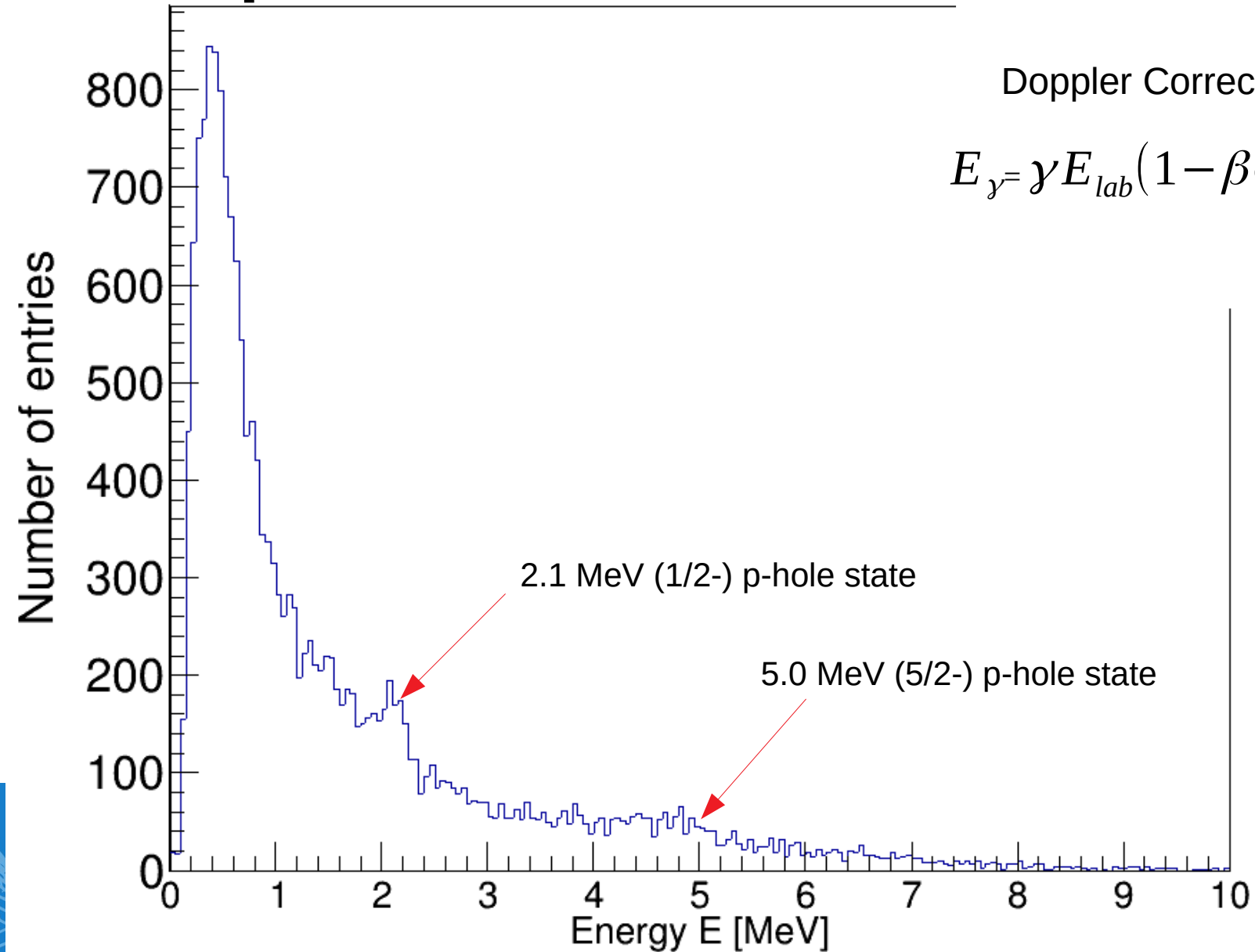


# $^{12}\text{C}(p,2p)^{11}\text{B}$ reaction





# Gamma Spectrum of $^{11}\text{B}$

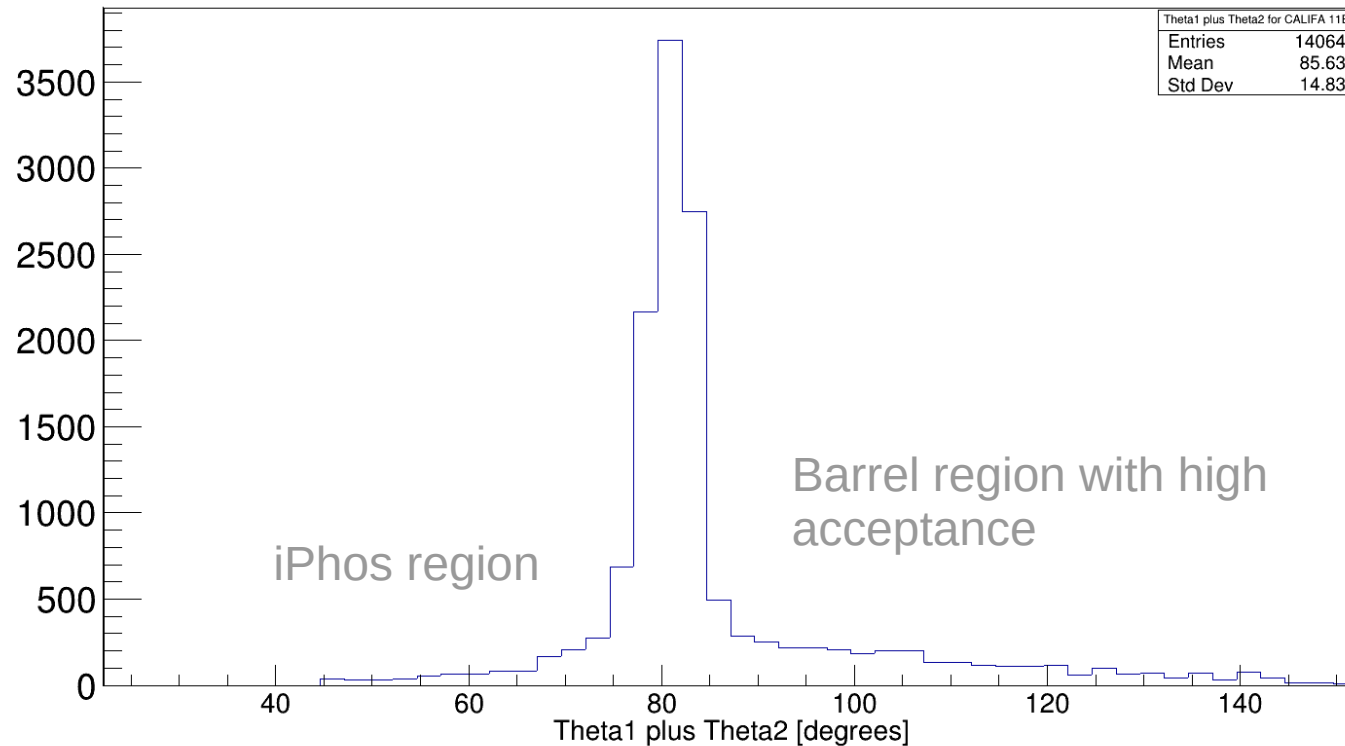
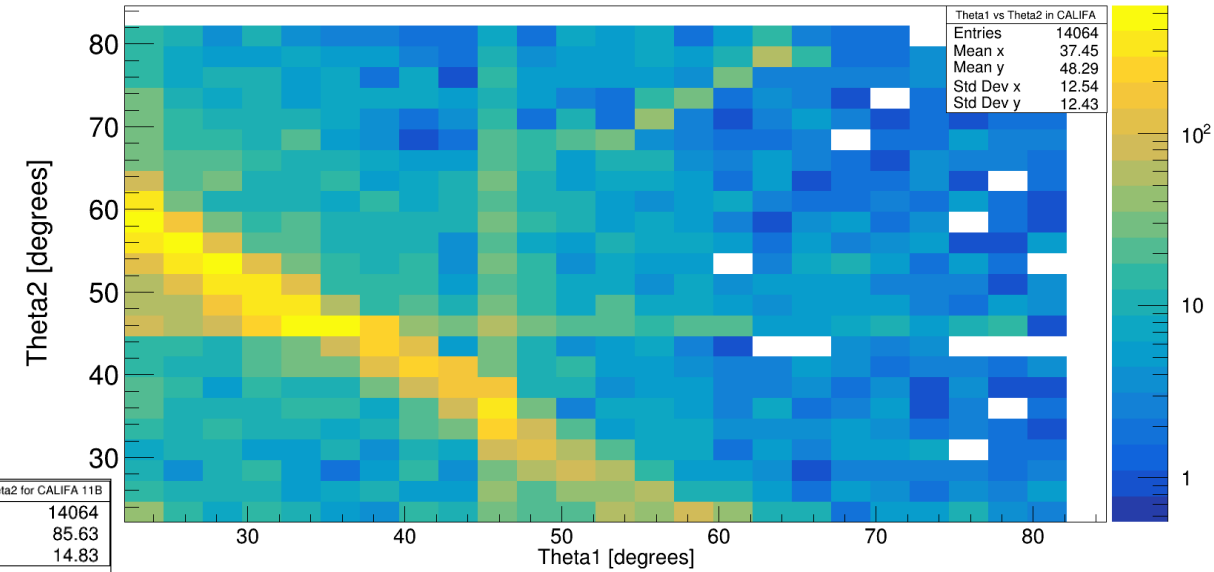
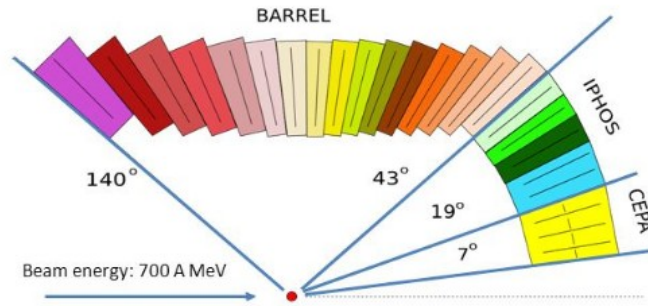




# Polar Angular Distribution of protons for $^{12}\text{C}(p,2p)^{11}\text{B}$



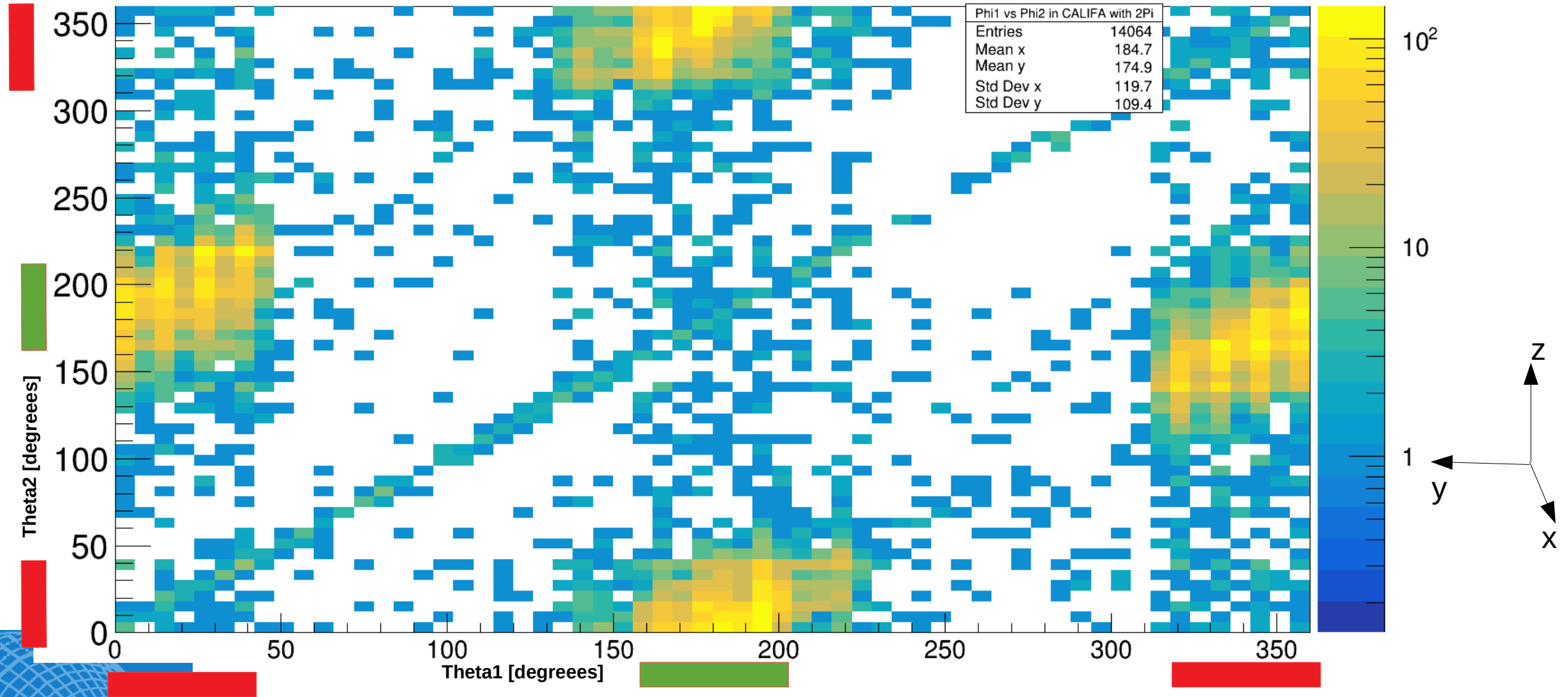
Theta1 vs Theta2 in CALIFA





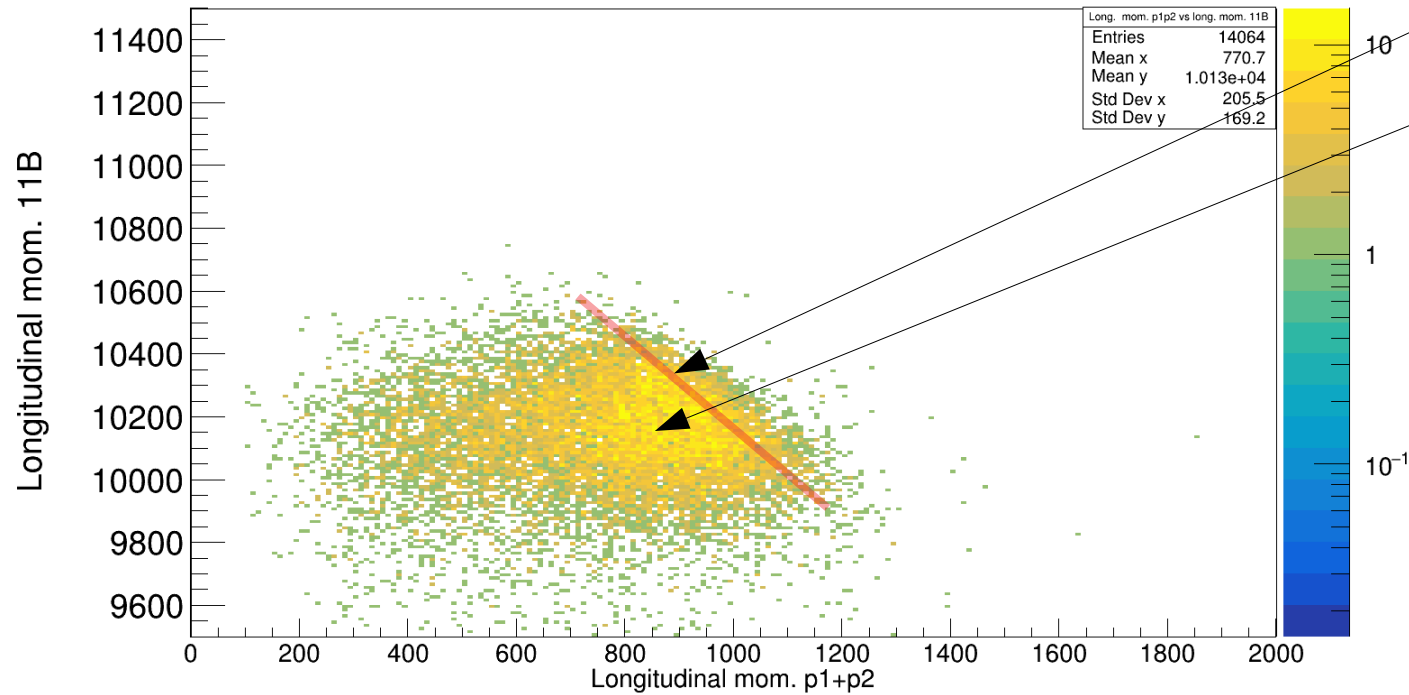


# Arzimuthal Distribution of protons for $^{12}\text{C}(p,2p)^{11}\text{B}$



- CALIFA left half (90°) iPhos
- CALIFA right half (45°) iPhos

Long. mom. p1p2 vs long. mom. 11B



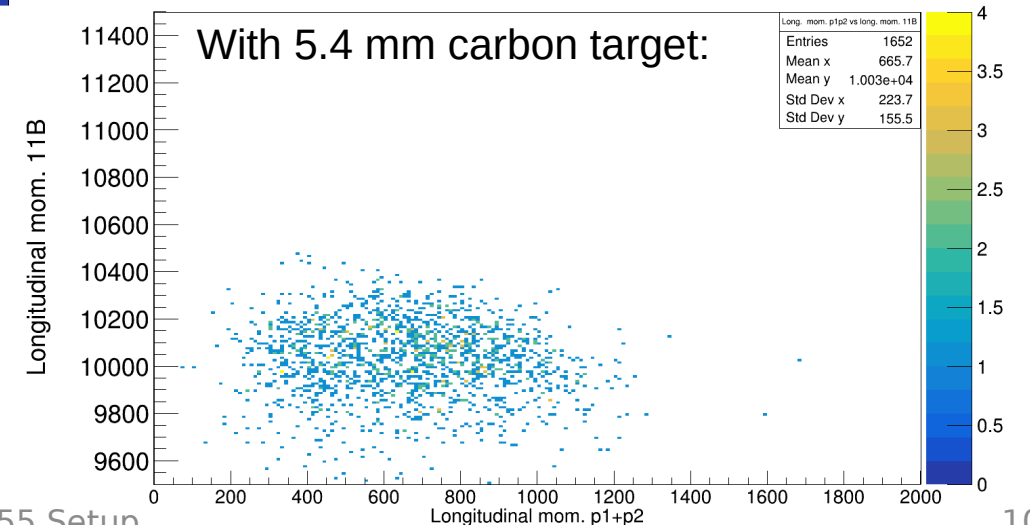
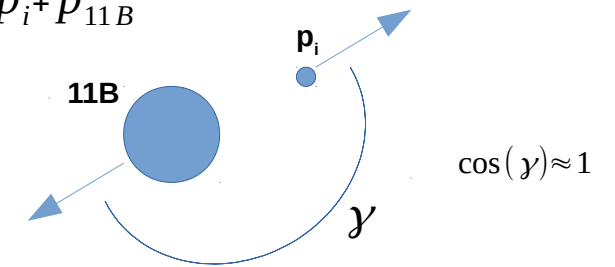
expected: barrier line

Explanation for smearing needed:

→ use simulation

→ boosting to 12C frame:

$$p_{12C} = p_i + p_{11B}$$





# Summary & Outlook



- Particle Identification works out
- Gamma spectrum and angular distribution plots look reasonable
- Further investigations for momenta distributions of the outgoing particles needed
- Expand analysis towards  $^{10}\text{B}$  isotope





# Thank you!

**CALIFA @ Technical University of Munich (TUM)**

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# Backup

