



**KoALICE**

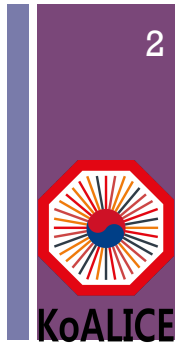
# PNU-KoALICE Report 2020-01

In-Kwon Yoo

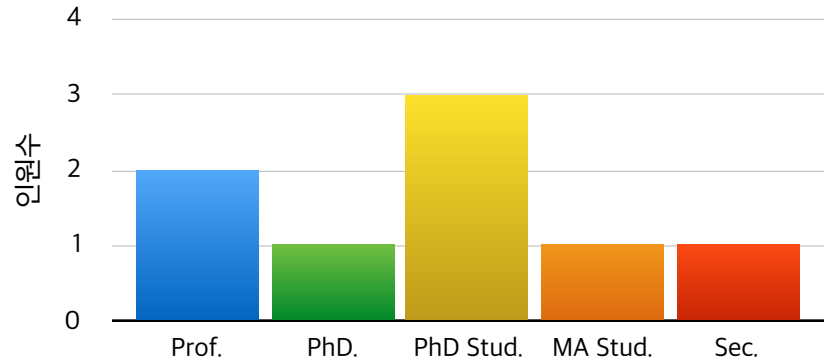
Pusan National University



# PNU-KoALICE Team (WHO)

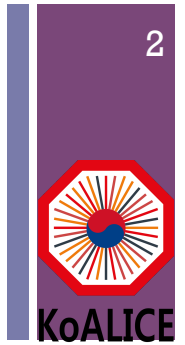


2016.05

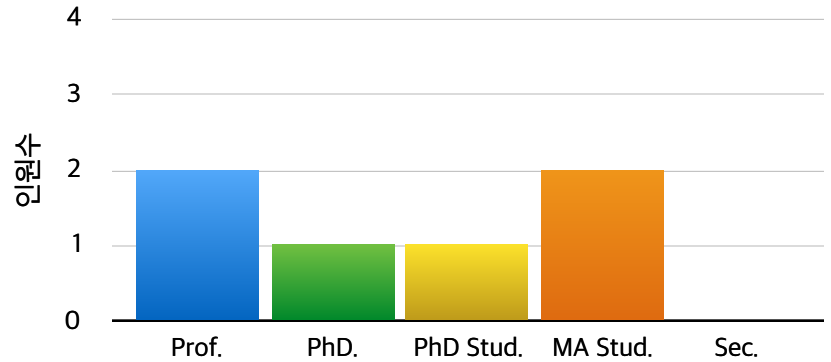




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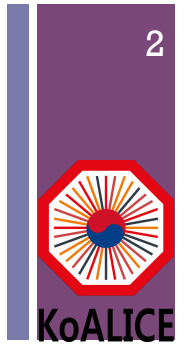


2020.01



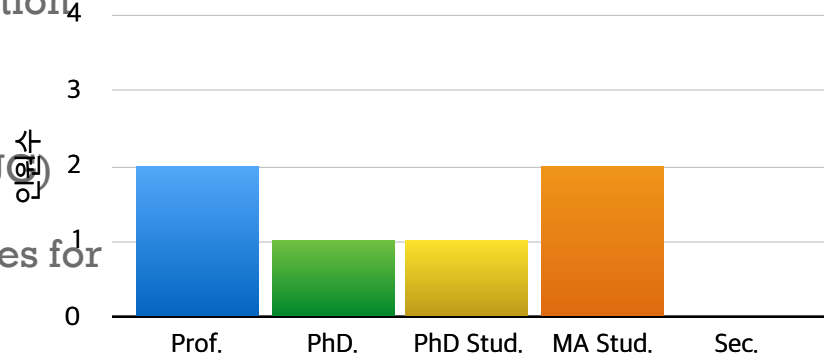


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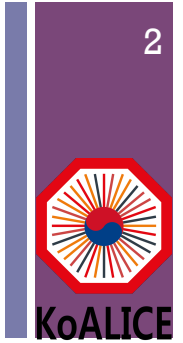
■ 2018.06 - 2019.01: 1Prof. + 1PhD + 2PhD Stud. + 3MA Stud. + 1Sec. + 2UG = 10  
2020.01

- JSEum return back to ALICE for HIC production<sub>4</sub>
- MJKwon upgraded to MA Stud.
- New Internship Stud. >SYChoi, JHYoon (+2UG)
- Potential: 1MA (SHLee) - 1PhD (JHSong leaves for





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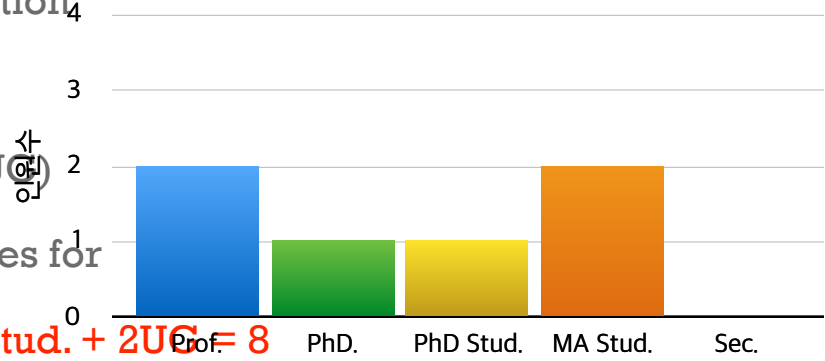
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■ JHSong (PhD), HYPark (Sec) left



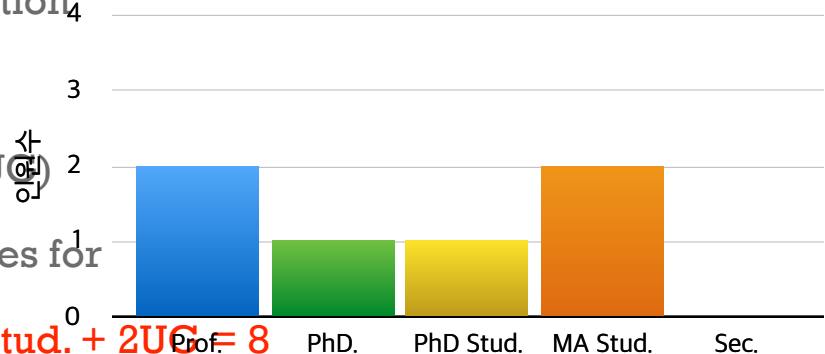


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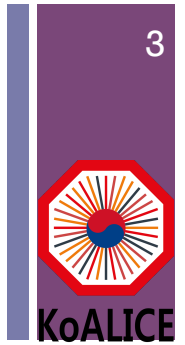
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- JHSong (PhD), HYPark (Sec) left

■ 2019.09 - 2020.01: **2Prof.** + **1PhD** + **1 PhD Stud** + **2 MAStud** + **5UG** = 9

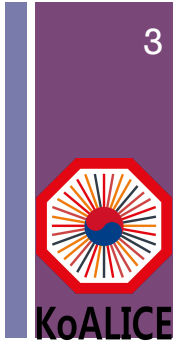
- **1Prof. (SHLim) joined, 1PhD (HJKim) temporarily joined**
- JSEum (PhD Stud.), SHLee (MAStud.) left
- JHRyu, SJJi, JHOH, JHYoon, SJKim (5UG)
- Arif Hussain failed to join HIPEX
- **JHKim** ready to join HIPEX as a MA Stud.

# + PNU-KoALICE Team Working Frame



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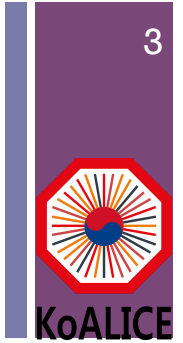
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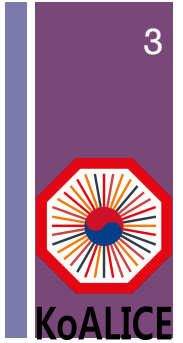
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- Timeline: 2009 - 2022 - 2025 - 2028 (modified with Silicon)



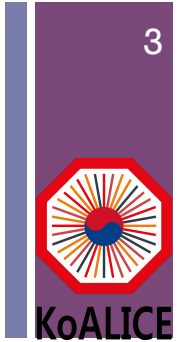
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  - Software (DA): HF (NPE) → LF (Resonance)/Exotic/HF → various Charmness

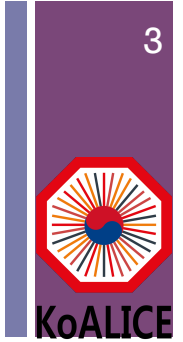


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  - PhD Stud.: PNU - CERN (2-3Y) - PNU for Physics Analysis
  - MA Stud./UG: PNU - CERN (<0.5Y total) for DET R&D
  - PhD: CERN/PNU for ALL

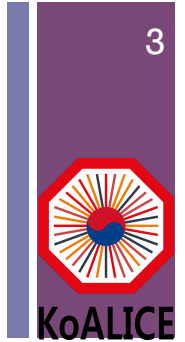


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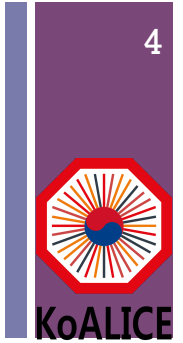
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- Working Group (<http://hipex.phys.pusan.ac.kr>) - using Google disk
  - Webserver problem! No secretary!
  - PWG/WP (1~2/wk): protocol → Lab.M (2 wks): report + discussion
  - LF PWG / MCT / HIC / PNU-Inha Vidyo Meeting
  - A new Web-frame and A new documentation-frame needed



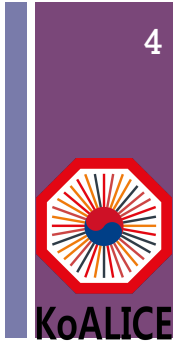
# Working Theme





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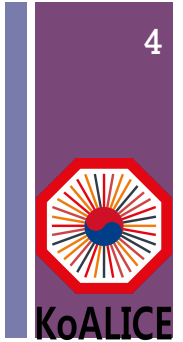
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  - Heavy Ion > LF / Exotic > Matter@LHC > Phase Transition in high  $\mu$
  - Scintillator > RICH + Silicon > Silicon > **Charmed Baryons ... (2021 - )**
  - **A new idea on trillions (2019 - 2030)**
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  - **Particle Correlations**
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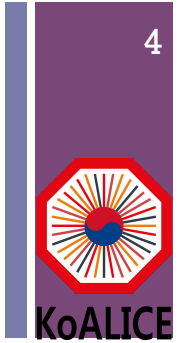






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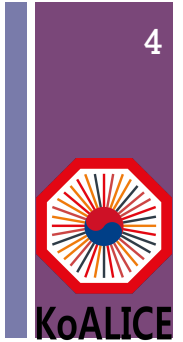
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  - Resonance / THERMUS / 1 short - 1 long paper on THERMUS > **Pending**



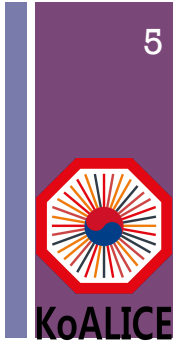


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- JHSong (CERN/PNU) (2018)
  - LF,  $\Sigma$ ,  $\Sigma^*$ ,  $\Xi^*$  Resonances > ' $\Xi^*$  in PbPb' **paper** in 2018  
> **delayed due to  $\Xi$  correction**
  - ' $\Sigma^0$  in pp' paper: soon submitted to the 1st round with IRC → **now in 2nd round**
  - Research/ITS Coordinator at PNU/CERN for KoALICE



# + Working Themes for Stud.

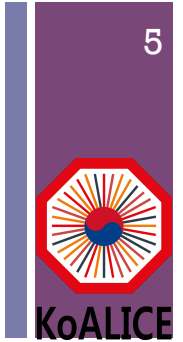




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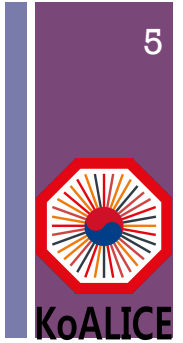
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## ■ **MJKwon (Lab. 2016.12 - ): Internship UG > MA Stud. since 2018.12**

- Mass Chip Test 2017.07 - 2018.06, HIC Electrical Tests incl. Setup (2017.10 - 2018.06 - 2019)
- MA Stud. in 2019 + ITS Commissioning during LS2 (temp. stay at CERN)
- MVD vs. ALPIDE chip + ALICIA study for CBM + Target/beamline study → Trillion simulation + Experiment





# A New Proposal for 2020-30

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KoALICE2030

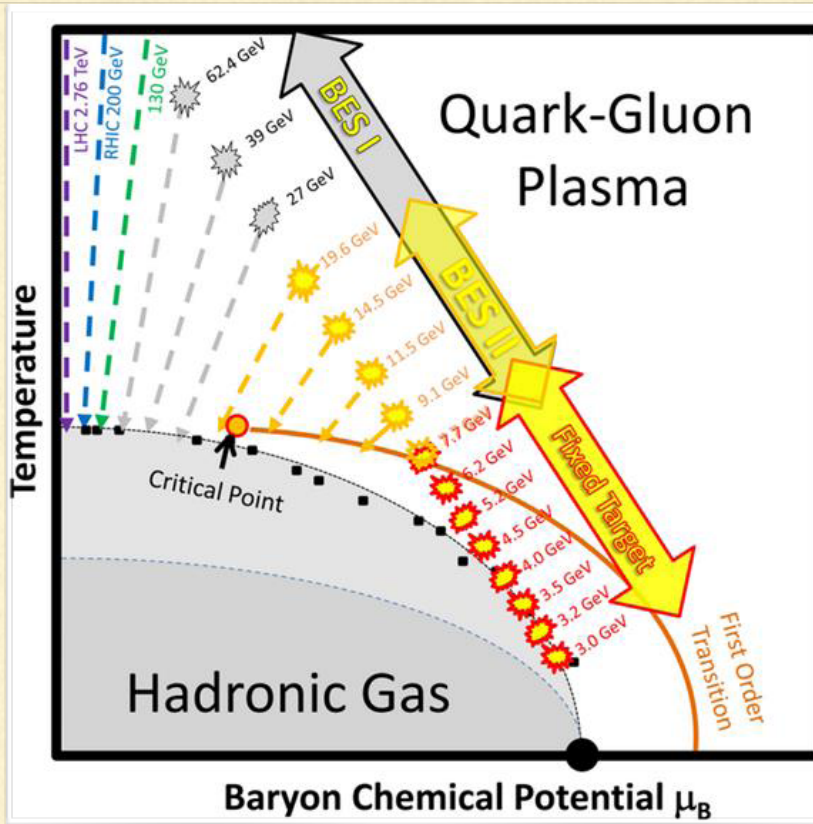


- Exploring a new area in QCD Phase diagram
- A totally new concept of 'Co'-llision > 'Tri'-llision
- Technical challenge
- A new probes with various 'charmness' (ITS2-ITS3)

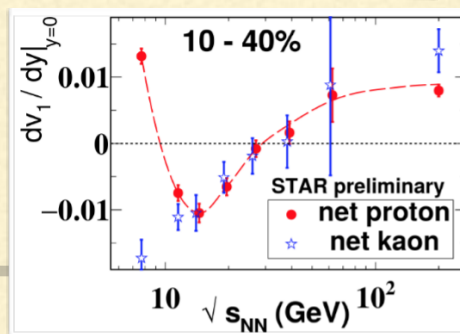
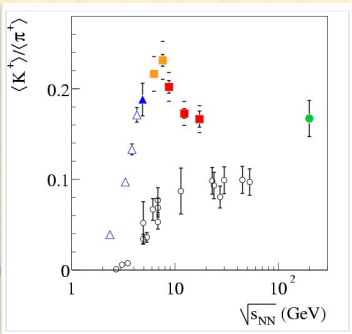
# EXPLORING QGP PHASE



KoALICE



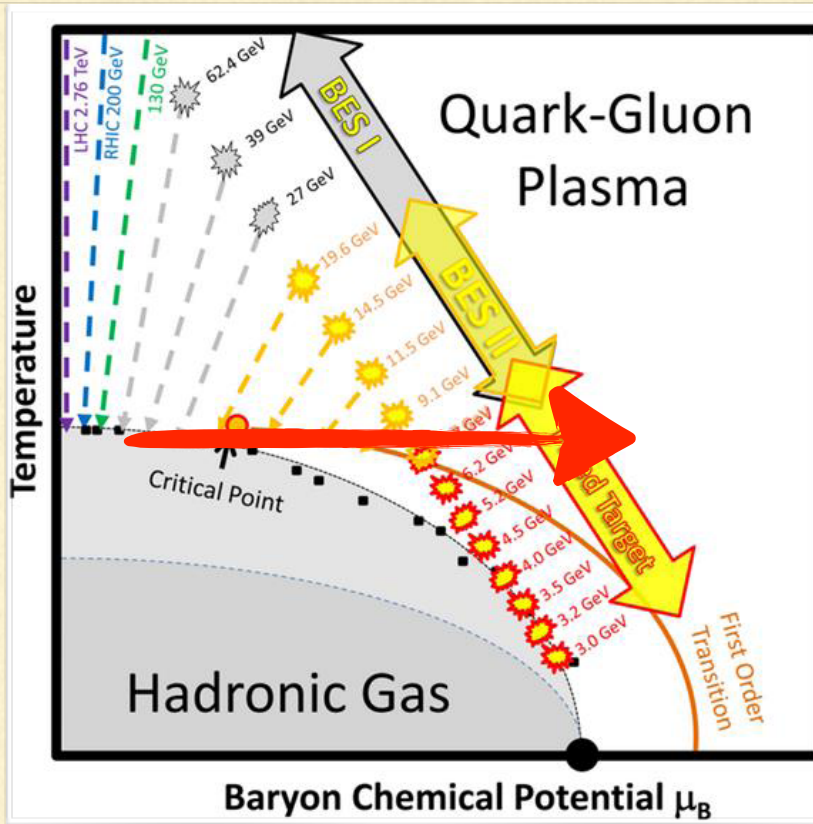
- Cross-over Region via URHIC @ LHC
  - Canonical Ensemble in AA
  - semi-canonical Ensemble in pA & even in pp (high-mul events)
  - QGP(? or any?) property study
  - no 1st-order Phase Transition
- High  $\mu_B$  region
  - Critical point Search (QGP? !!)
  - 1st-order Phase Transition (QGP? !)
  - BESII with STAR (lower  $\sqrt{s_{NN}} \sim$  boost of  $\mu_B$ )
  - even higher  $\mu_B$ ?



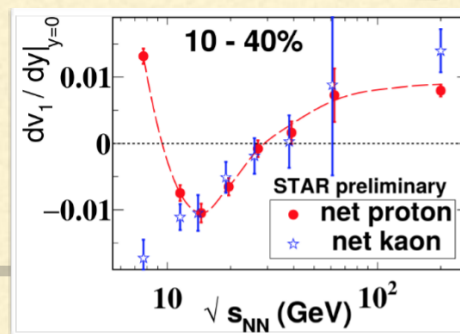
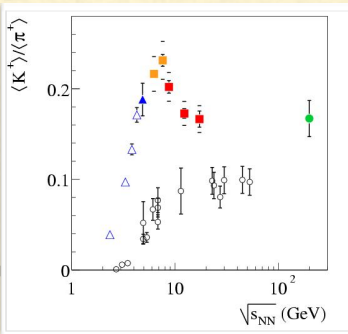
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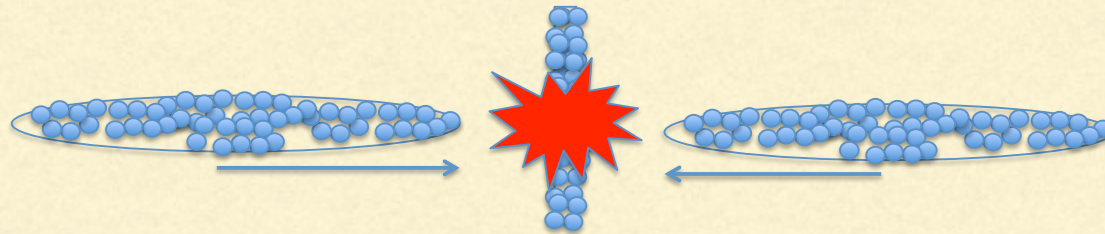


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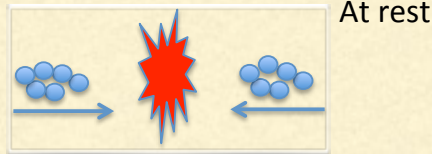
# AN IDEA ON EXTREME COLLISION EXPERIMENT

- Extreme Collision Experiment for higher  $\mu_B$ 
  - A target at the colliding point



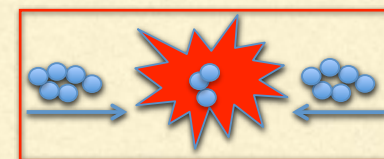
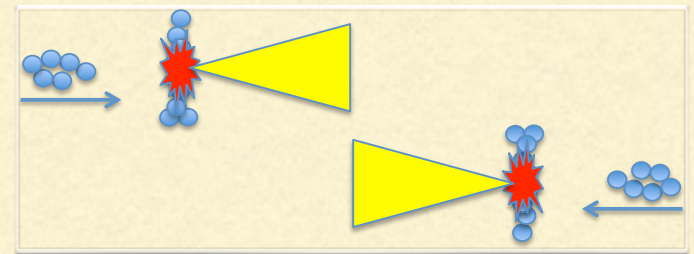
- Complicated collisions

- Colliding events



- fixed target collision events

- tripple (AAA) collision events ( $2 \times \mu_B$ )



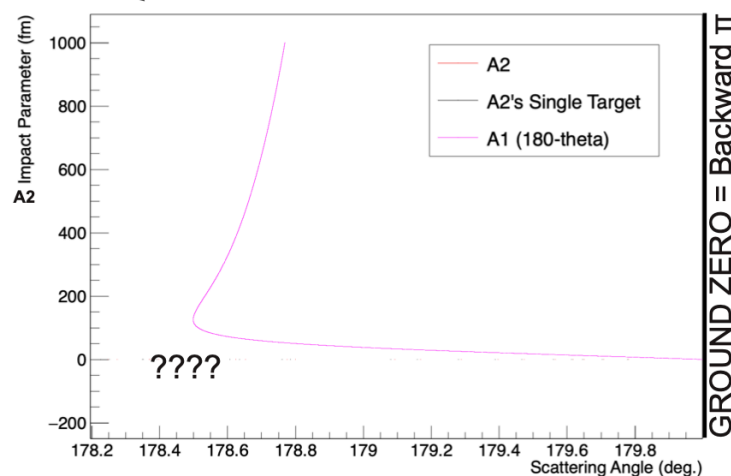
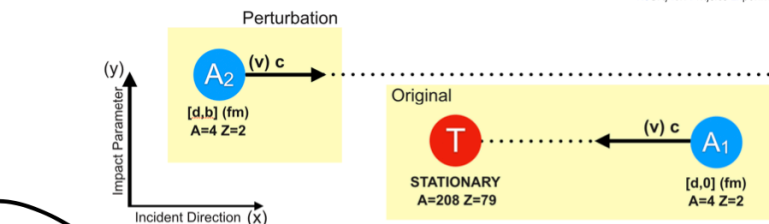
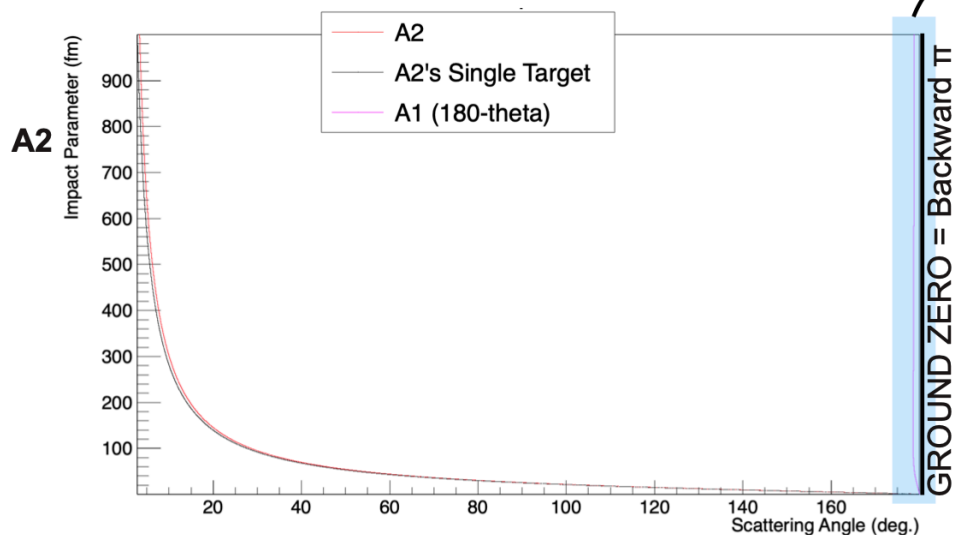
# MJKwon's study on-going

Heavy Ion Physics Experiment

HIPEX  
Heavy Ion Physics Experiment

## Perturbed Fixed Target Experiment

After perturbation



NEED TO KNOW WHAT IS HAPPENED