

Introduction about the EIC-Japan activity

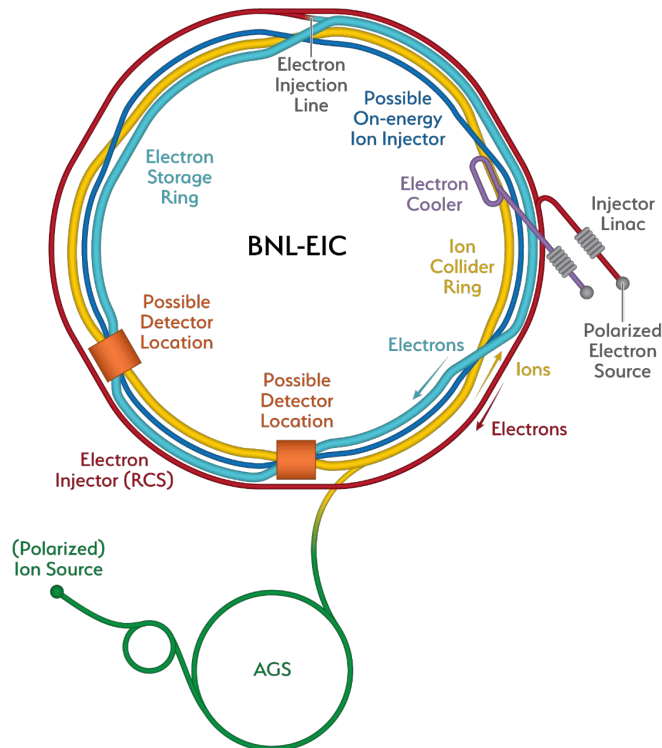
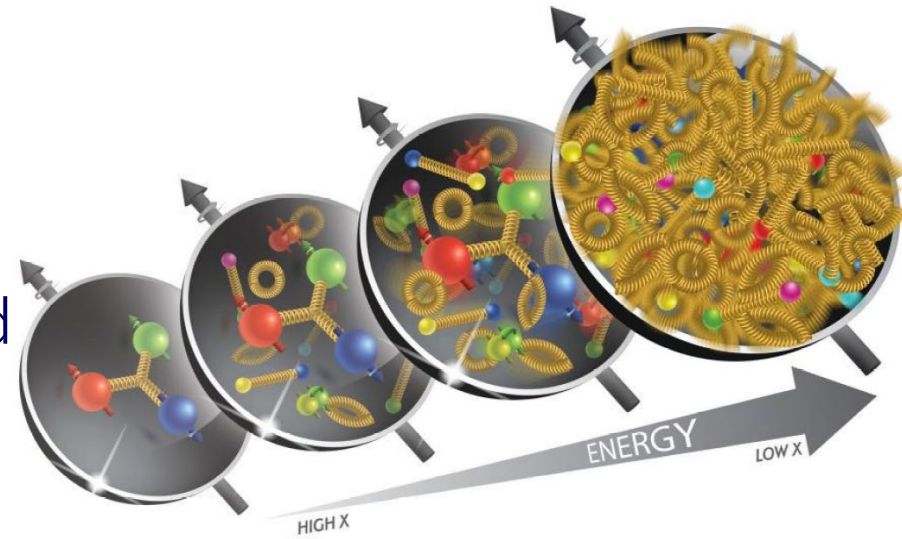
EIC Meeting with Japanese Physics Society

May 12, 2021

Y. Miyachi (Yamagata Univ.) and Y. Goto (RIKEN)

Electron-Ion Collider (EIC) Project

- Collider of polarized electron + polarized p/d/³He or nuclei
 - 2019.12: CD-0 (Approve Mission Need)
 - 2020.1.9: U.S. DOE selected Brookhaven National Laboratory to host the EIC



• Physics at EIC

- How does the mass of the nucleon arise?
- How does the spin of the nucleon arise?
- What are the emergent properties of dense system of gluons?

EIC activities in Japan

- **Before CD-0 (2019.12)**

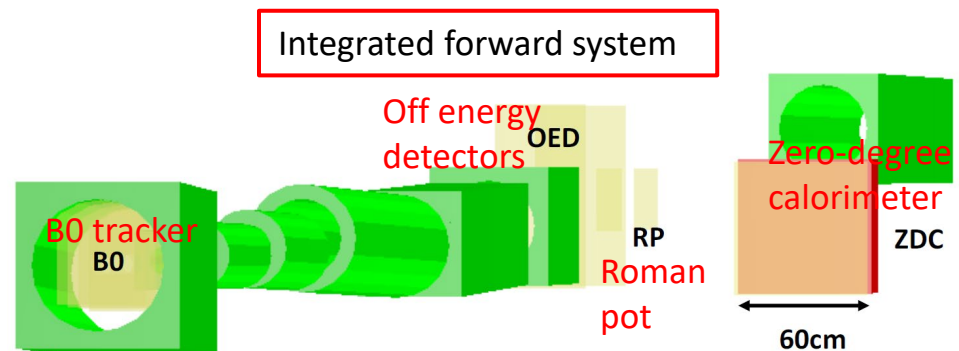
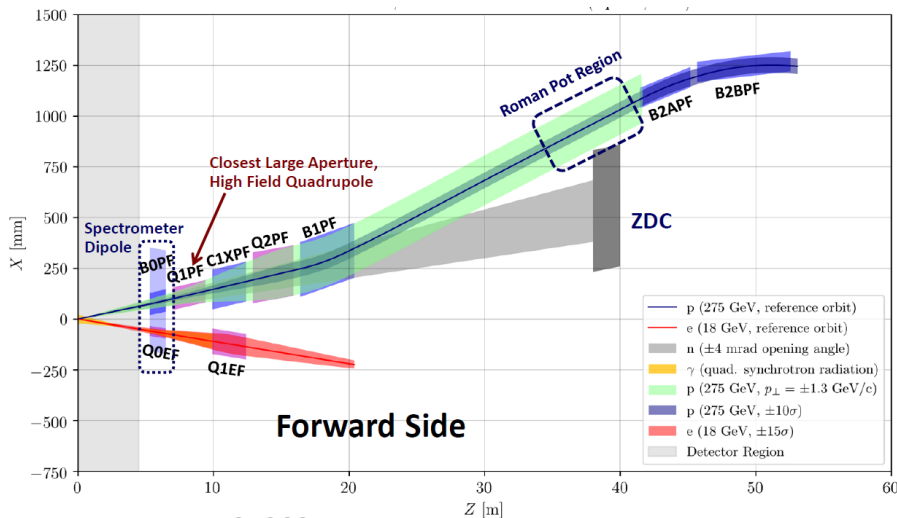
- 2012.3.27: JPS meeting invited talk by A. Deshpande
- 2014.10.7: JPS/DNP workshop at Hawaii “Future directions in High Energy QCD”
- 2015.4: EIC Letter of Interest from Asian countries
 - 20 from Japan
 - 10 Experimentalists: RIKEN, Tokyo Tech, Yamagata Univ.
 - 10 Theorists: Juntendo Univ., KEK, Kyorin Univ., Kyoto Univ., Niigata Univ., RIKEN, Tohoku Univ., Tokyo Univ. of Science
 - 7 from China
 - 3 from India
 - 4 from Korea
- 2016.8.3: Workshop on “Prospects on EIC project” at J-PARC
- 2018.4.15: Pre-DIS EIC workshop at Kobe
- 2018.10.23: JPS/DNP workshop at Hawaii “Hadron structure”
- 2019.9.24-26: CFNS & RBRC workshop at Stony Brook Univ. on “Physics and detector requirements at zero-degree of colliders”

EIC activities in Japan

- **2019: Master Plan 2020 proposal of Electron-Ion Collider (EIC)**
 - Selected as a major academic research project
 - Not selected for a hearing for the priority project
 - Core institutions: Yamagata Univ. & RIKEN
 - Participating institutions: Kobe Univ., Nihon Univ., KEK, etc.
- **After CD-0 (2019.12)**
 - 2020.3: 原子核研究「電子-イオン衝突型加速器 (EIC) 計画」
 - 2020.5: EIC R&D program proposal “Developing a high resolution ZDC for the EIC” (eRD27)
 - 2020.7: U.S.-Japan science and technology cooperation program in high-energy physics (special category)
 - 2020.8: U.S.-Japan hadron physics exchange program for studies of hadron structure and QCD (2020.9-2023.9)
 - 2020.8-9: KEK workshop on intersections of particle and nuclear collider physics

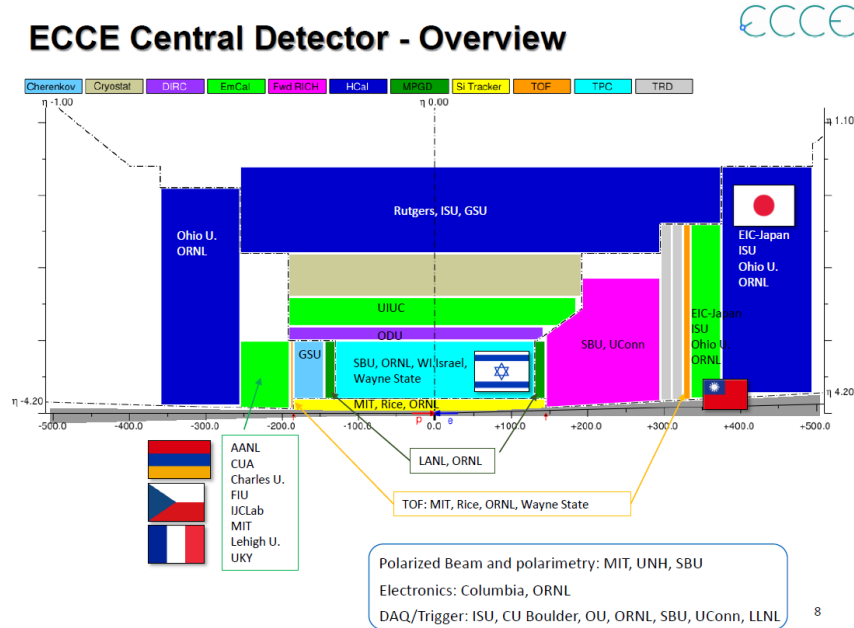
EIC-Japan activity

- Collaboration including nuclear-physics community and high-energy community
 - Nuclear physics: Yamagata U., RIKEN, Nihon U., U. of Tsukuba, JAEA
 - High-energy physics: Kobe U., Shinshu U., Kyushu U., KEK
 - Cosmic ray: Nagoya U., ICRR
- EIC detector R&D: eRD27
 - “Developing a High Resolution ZDC for EIC”
 - Collaboration with Kansas U., ODU, etc.
- Regular meetings
 - Radiation study
 - Discussion & simulation on EIC-ZDC configuration



EIC-Japan activity

- Expression of Interest (EOI) from EIC-Japan (2020.11)
 - Forward hadron calorimeter
 - Cooperation with UCLA & Korean group
 - Zero-degree calorimeter (EM & hadron)
 - Cooperation with eRD27 (Kansas Univ., ODU, etc.)
 - Silicon detector
 - Cooperation with ANL, BNL, etc.



Silicon Hybrid Detector = SOIPIXD + UFSD

