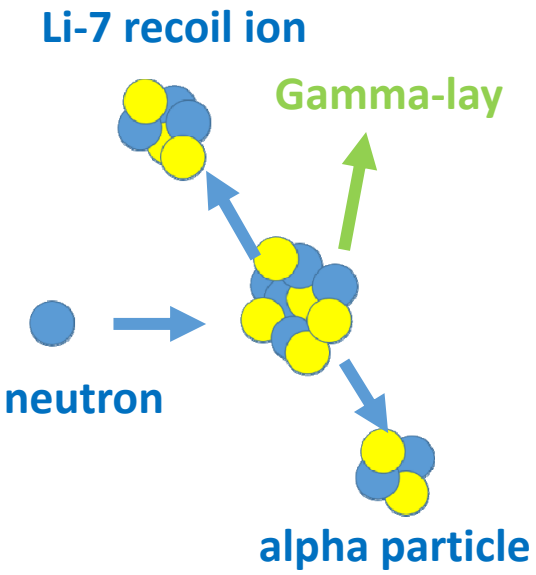
KOREA BASIC SCIENCE INSTITUTE

DAWONSYS

The Development of ECR ion source for Medical Applications

Korea Basic Science Institute
Busan Center
Byoung-Seob Lee

1. Needs & Treatment Effect of BNCT



❖ Treatment Effects

❒ **Overcoming limitations of convectional particle therapy**

- Clarity of therapeutic principles
- Treatment of unit cell size
- Minimization of radiation exposures for normal tissues
- Reduction of side effects
- Treatment of malignant cancers which are not effective with conventional treatments (Brain Tumor, Head & Neck Cancer, Malignant Skin Cancer, Recurrent Cancers, Radiation Resistant Cancers)

❖ Cost Prospective

- Low construction cost (about 1/3 of proton therapy facility)
- Low fractional treatment (1-2 times)
- Low treatment cost (about 1/3 of proton therapy facility)

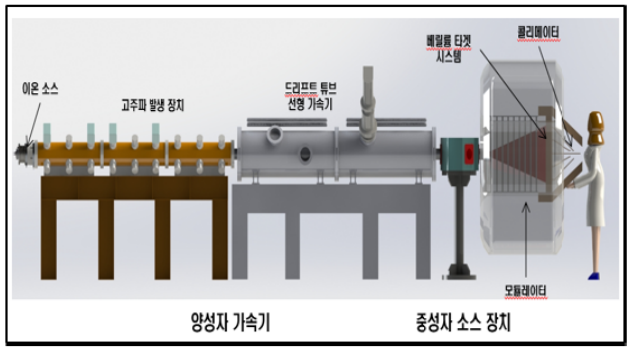
❖ Limitation of BNCT & Issues

- Increasing Treatment depth
- Improving the boron capture ratio of cancer cells / normal cells
- Improving boron drug delivery method

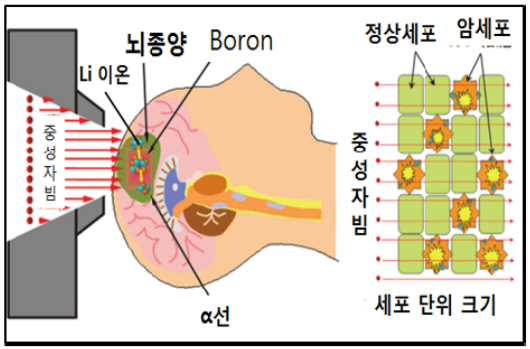
2. Summary of A-BNCT Project

- **Project Name :** Development of the accelerator based Boron Neutron Capture Therapy system for the cancer treatment within 1 hour therapeutic time
- **Project Period :** 2016 . 4 ~ 2020 . 12
- **Leading Organization :** Dawonsys Inc.
- **Participating Organization :** Gil Hospital, Gachon Univ., PAL, KAERI and **KBSI**
- **Project Berget :** 14.1 B Won (excluding building & utility costs)
- **Development Items :** Proton Linac, Be Target Assembly, Dosimetry, Radiation Safety, Boron Compounds TPS(Treatment Planning System), Clinical Trials, Government Permission of B Drugs & BNCT Treatment

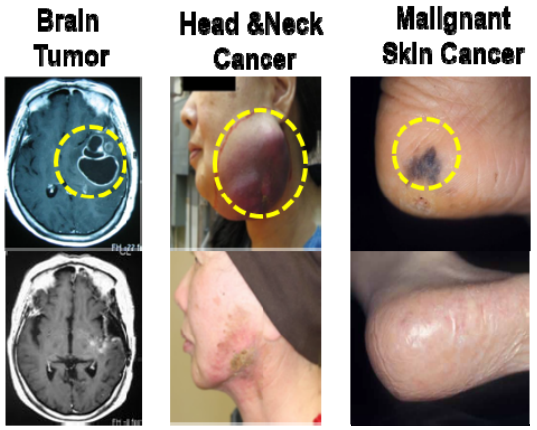
A-BNCT Facility



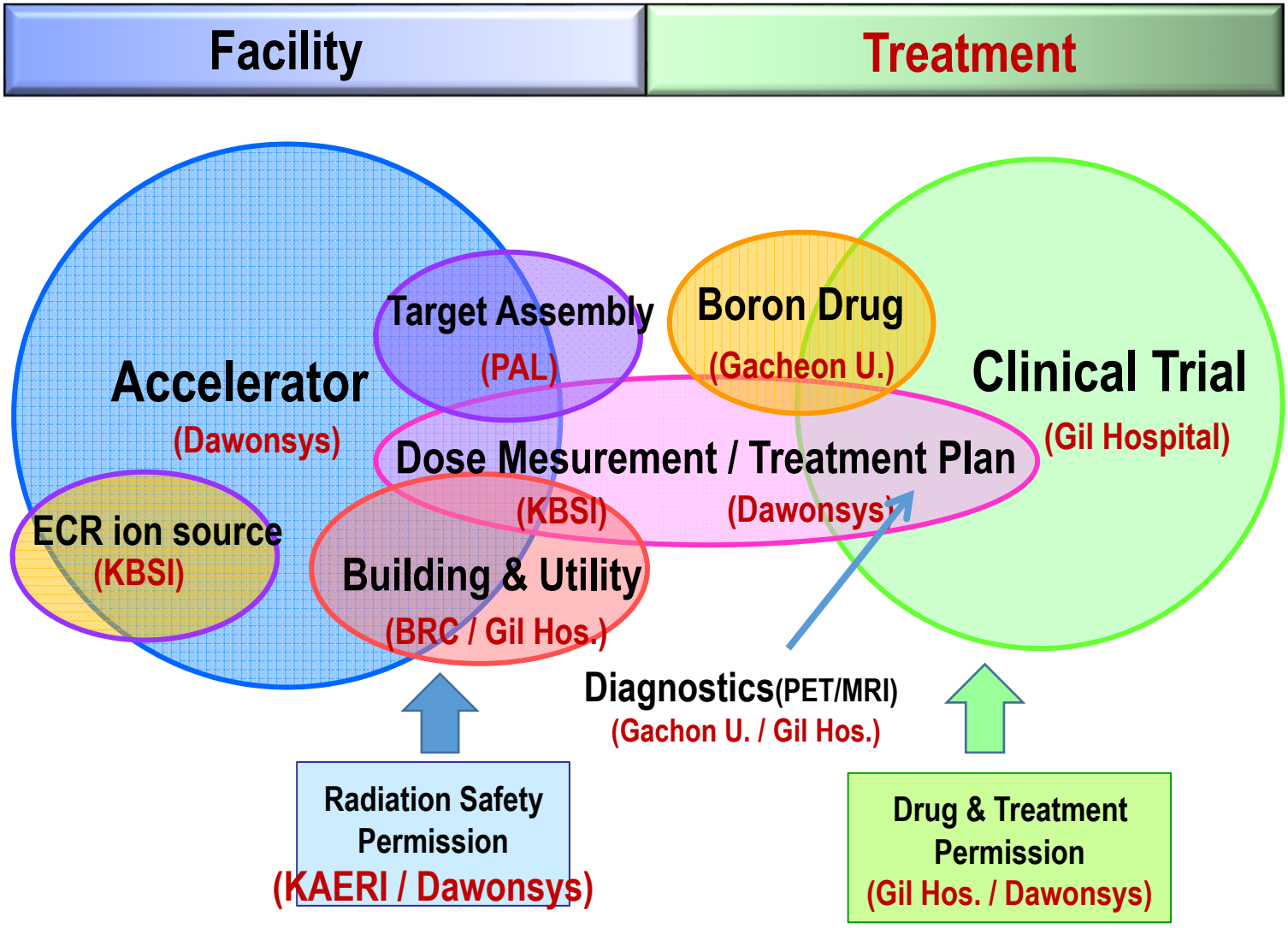
BNCT TPS



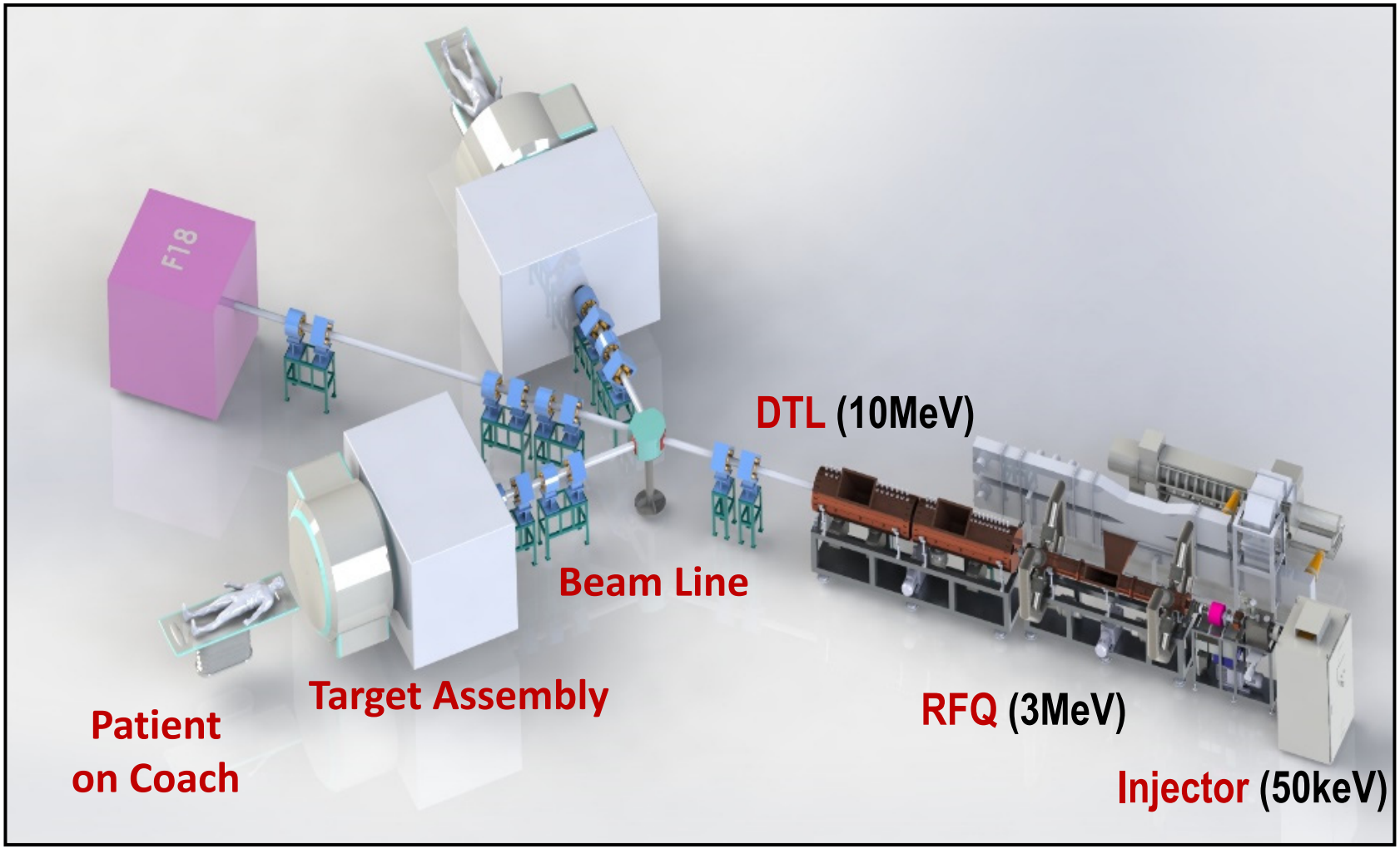
BNCT Treatment



3. Working Group

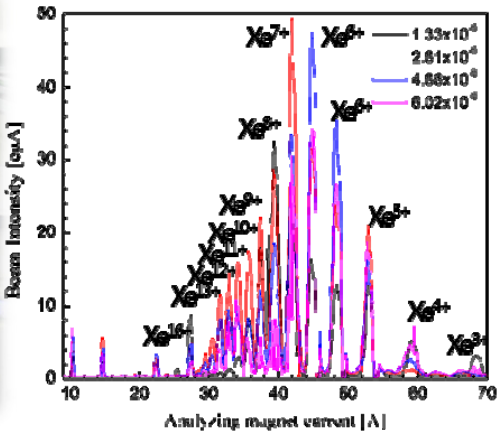


4. Configuration of A-BNCT Components



5. History of ECR ion source at KBSI

2.45 GHz ECR ion source development in 2009



28GHz Superconducting ECR ion source development in 2015

Proton ECR ion source for A-BNCT & Proton Therapy

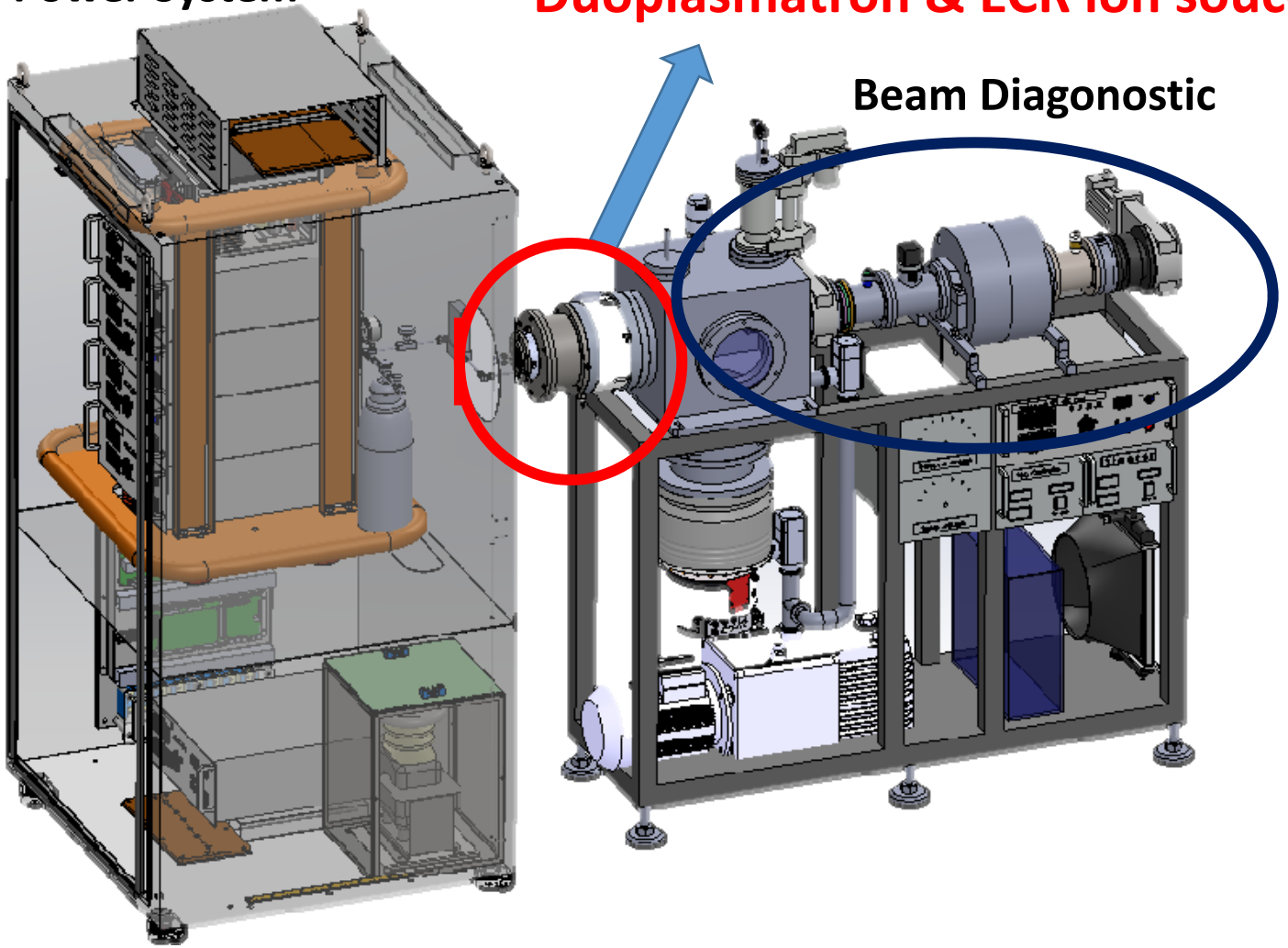
Key Issues
- High Voltage Flatform over 50kV
- Requirement of small emittance 0.2 πmm.mrad
- High Current over 50mA

6. Configuration of A-BNCT ion source

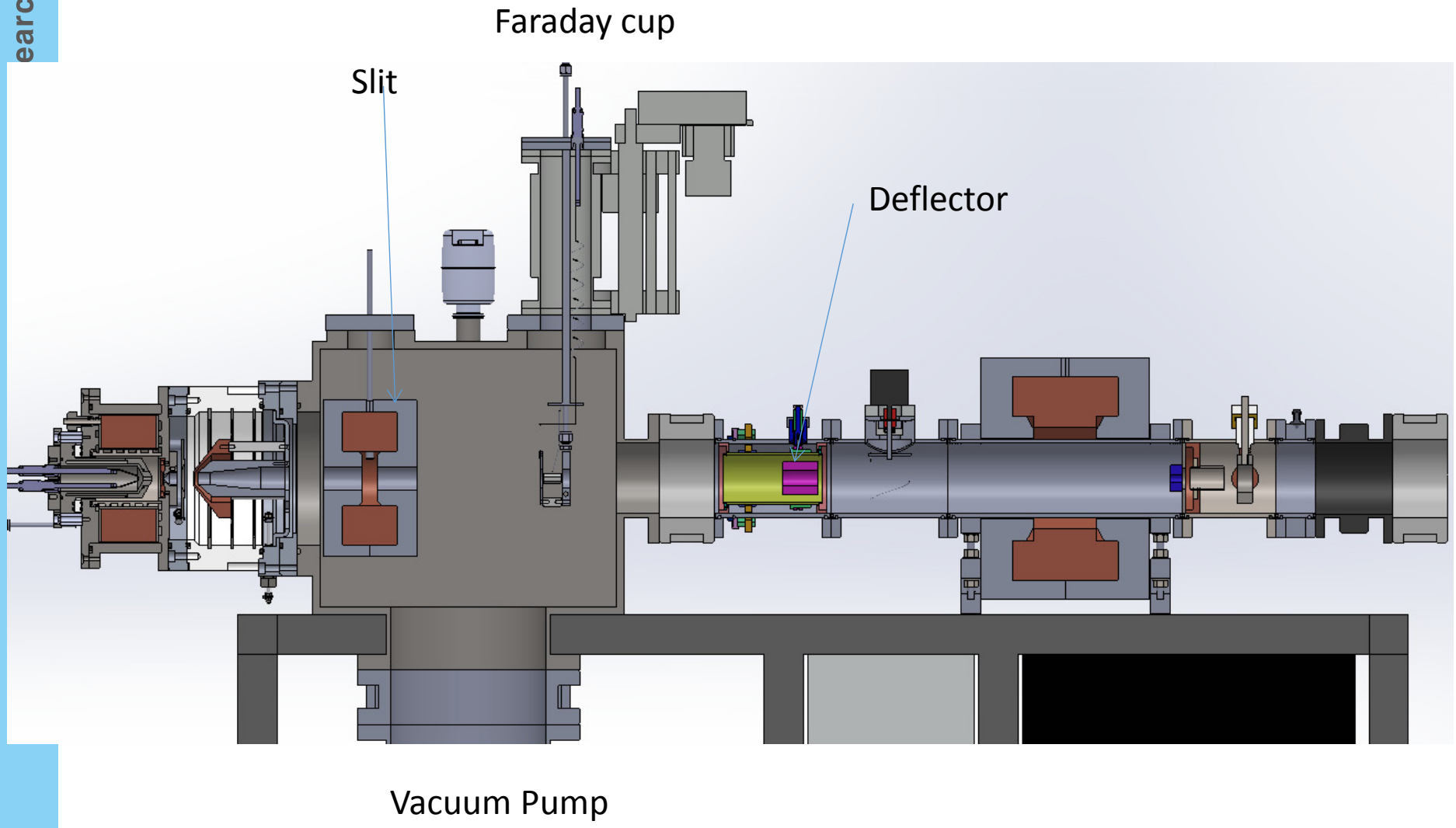
High Voltage Power System

Duoplasmatron & ECR ion souce

Beam Diagonostic



6. Configuration of A-BNCT ion source



7. Concluding Remark

- The A-BNCT Project is staring from this year
- We will design until this year for A-BNCT
- Next year new Proton ECR ion source will manufacturing
- We need more information about key issues for new ion sources

과학으로 지키는 국민행복, with KBSI!

Thank You

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