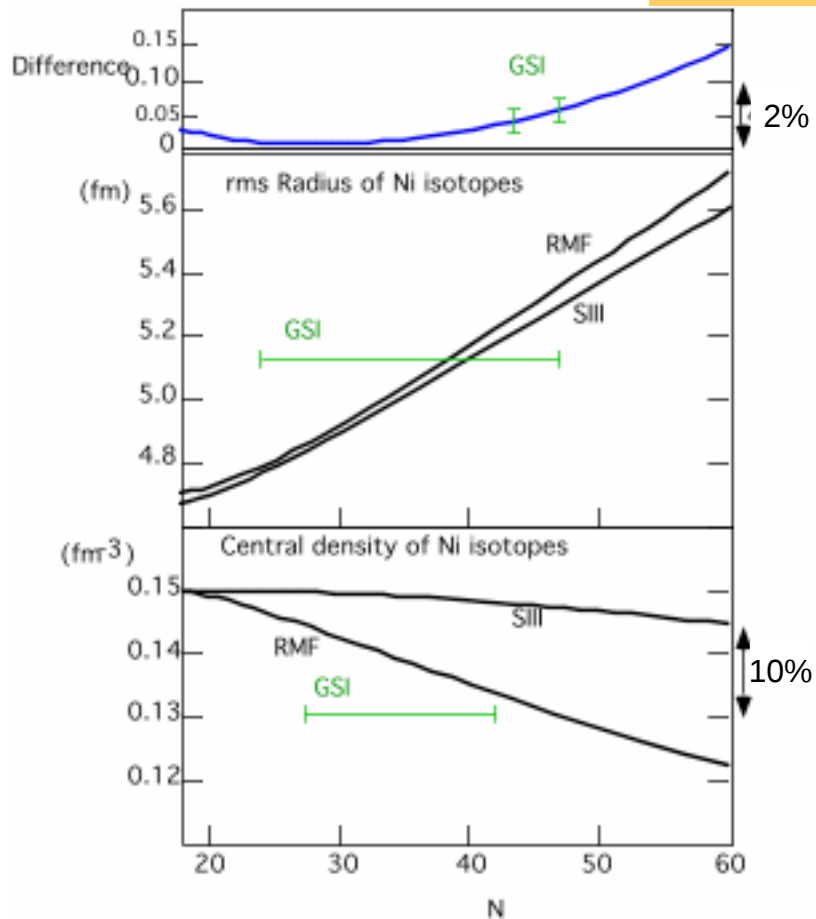


S272: Density distribution of $^{58,72}\text{Ni}$ and ^{72}Ge from proton elastic scattering

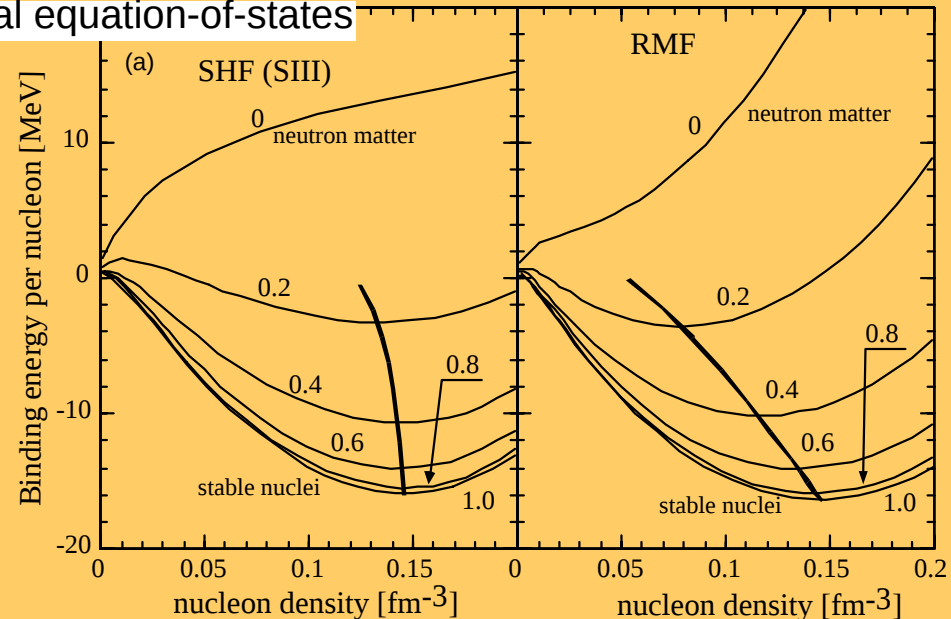
- **Spokespersons:** I.Tanihata, R. Kanungo
- **GSI Contact Person:** C. Nociforo
- **Year of Approval:** 2003 (re-approved 2008)
- **Shifts:** 60 (approved) : main user
59 (remaining) : main user
- **Beamtime Request :** 2009 (Summer)

Constraint on EOS of asymmetric nuclear matter through measurement of density distribution

Sensitivity required :



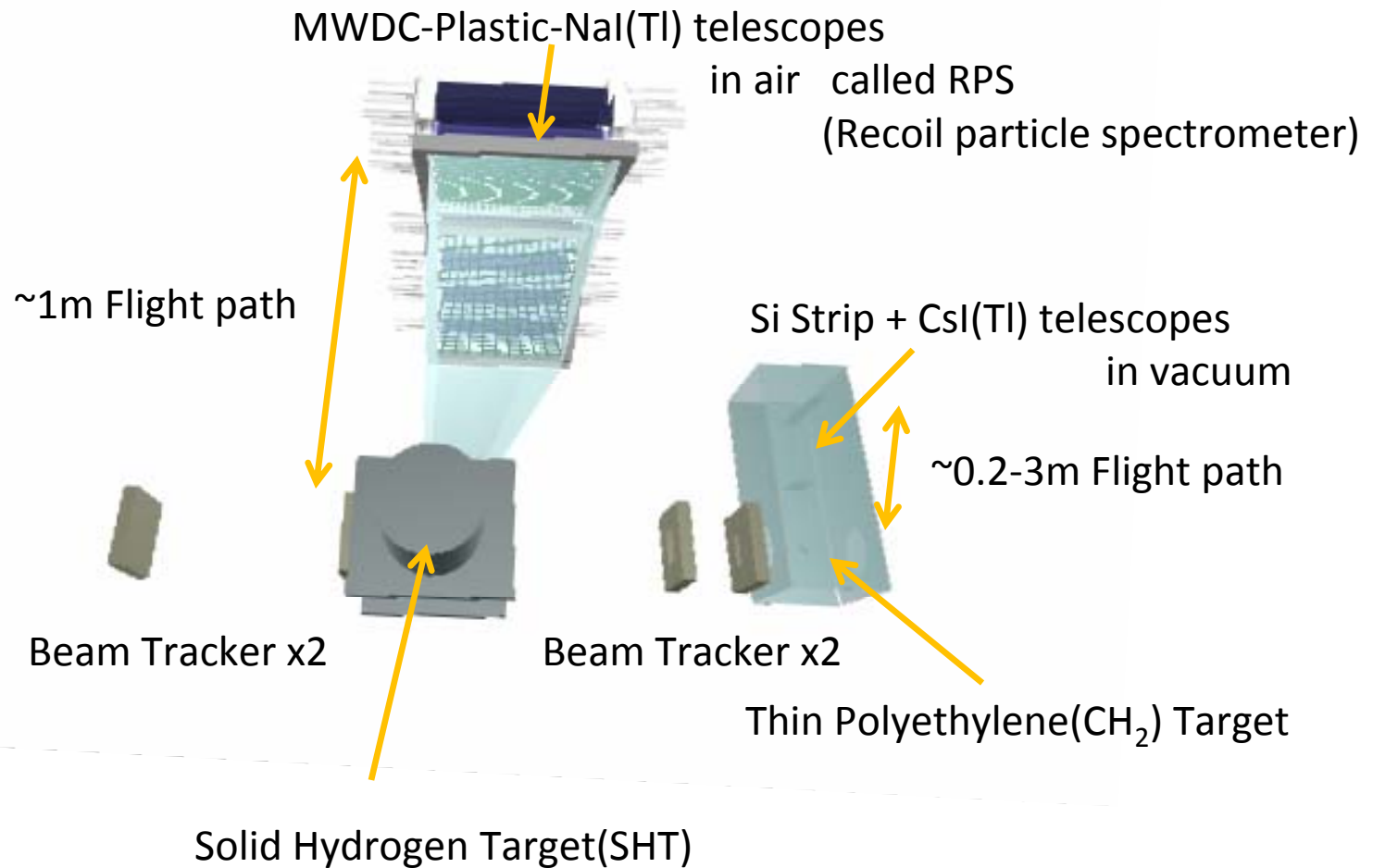
Two typical equation-of-states



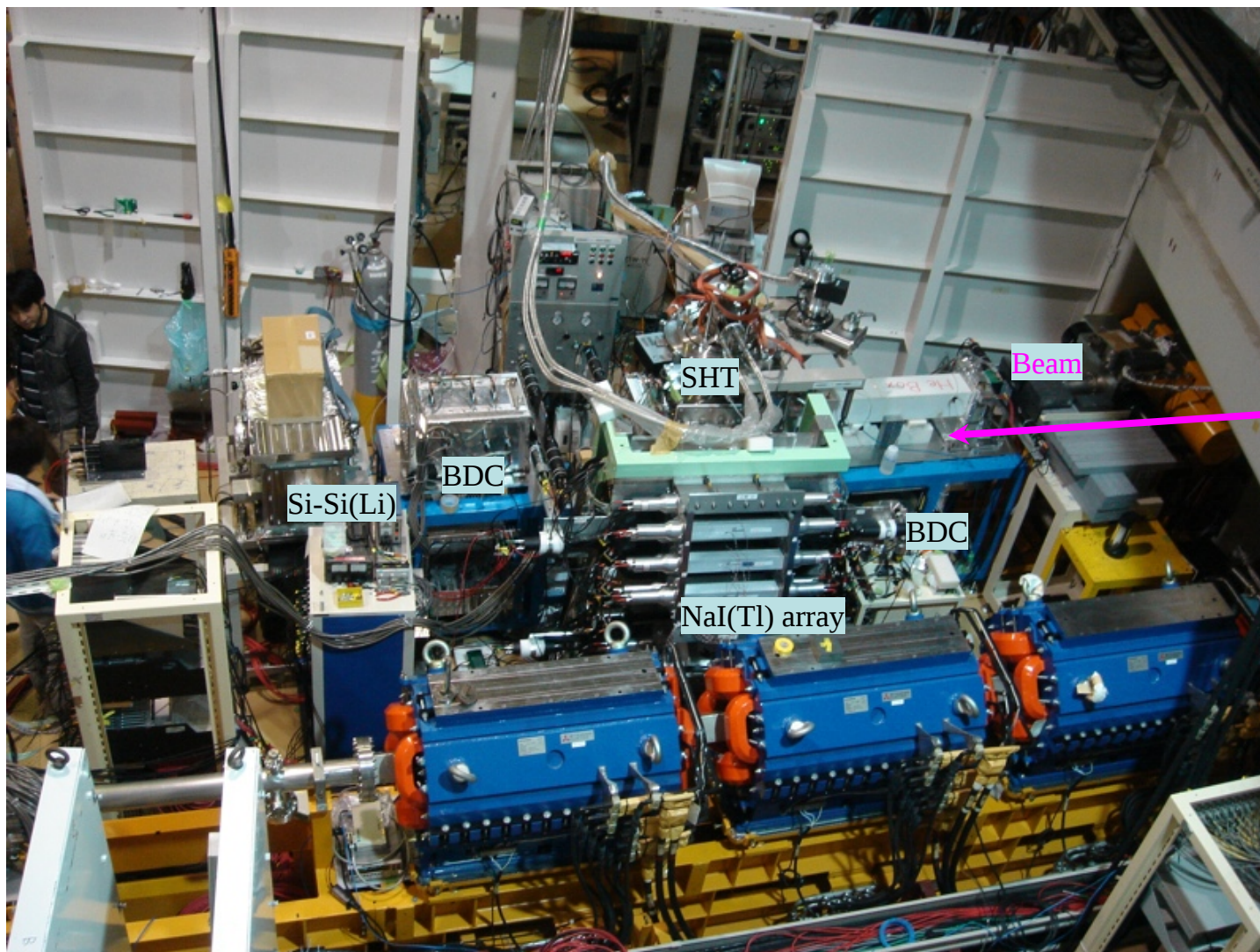
Discrimination between different models require :

- The density should be measured with 10% accuracy.
- The root mean square radius requires 2% accuracy.

Basic setup @NIRS-HIMAC



Experimental system (tested @ NIRS)



Primary beams and target

Beams :

^{86}Kr (600 MeV/u) $\geq 10^{10}$ /spill

^{58}Ni (450 MeV/u) 10^5 /spill

^{72}Ge (450 MeV/u) 10^5 /spill

Production target (at FRS
entrance) :

Be (3 g/cm²)

Requirements for the setup

- FRS detectors :

- Plastic, degreder, TPCs @S2
- Plastic, TPCs, MUSICs @S4

PID and Beam Tracking

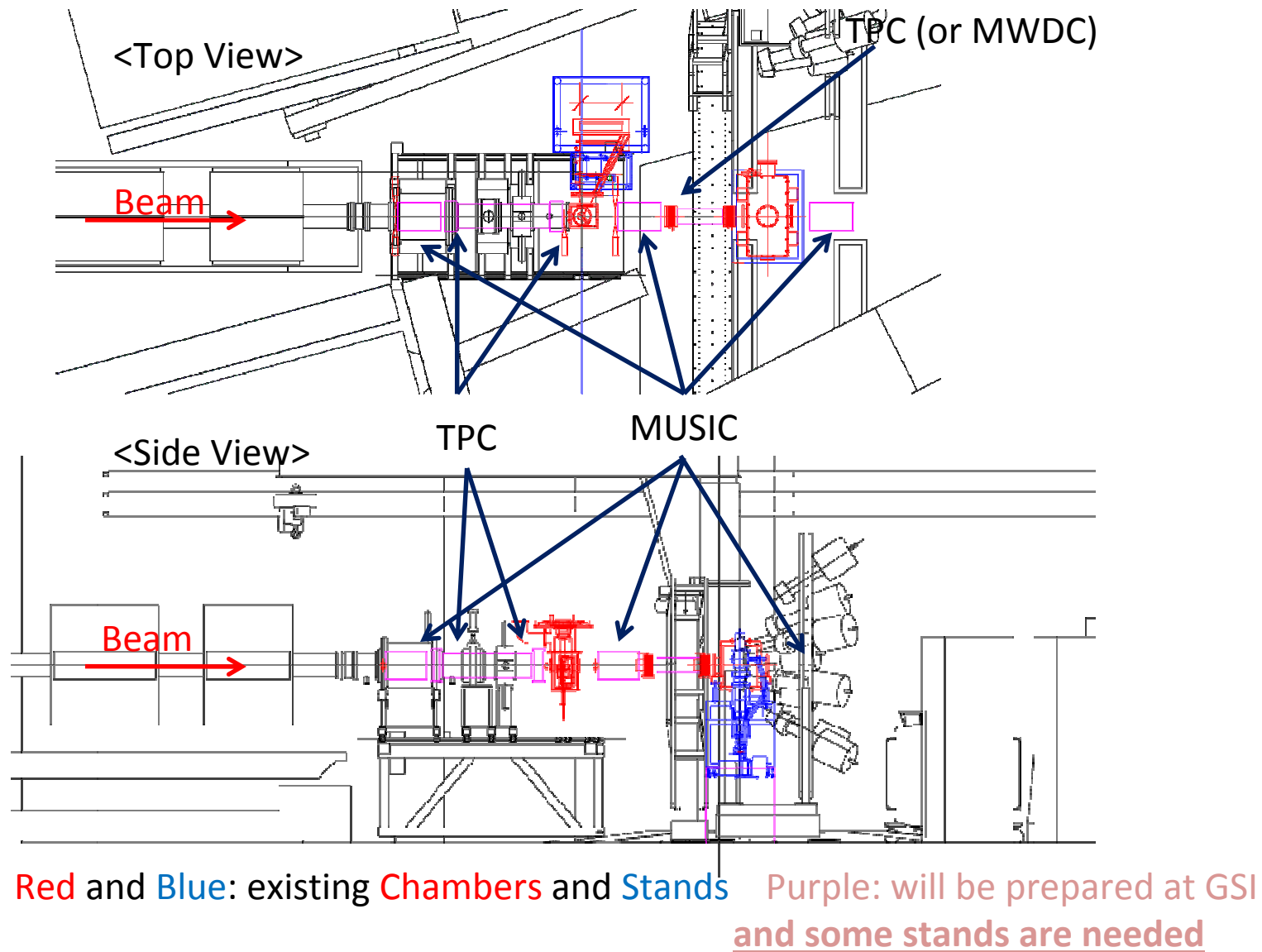
- New equipment :

- All the other detectors, target and scattering chamber will be shipped from Japan
- Shipping time ~ 1 month
- Setup time at FRS ~ 1 month
- Offline test time ~ 1 month

- DAQ/electronics :

- Standards FRS DAQ (MBS), some electronics will be new

S4 experimental setup under discussion



Other requirements

- Gas : Hydrogen [for target]
Ar(50%) + CH₄(50%) [for proton drift chambers]
He(50%) + CH₄(50%) [for beam drift chambers, *if used*]
- Solid hydrogen target : safety procedures of GSI to be done
- Vacuum pumps, transformers, HV : available at GSI

Collaboration

Japan : Osaka U, Miyazaki U, Tohoku U, Tsukuba U, RIKEN

Canada : St. Mary's U

Germany : GSI, TU Muenchen

Slovakia : U of Bratislava

Netherlands : KVI