RECODE Program

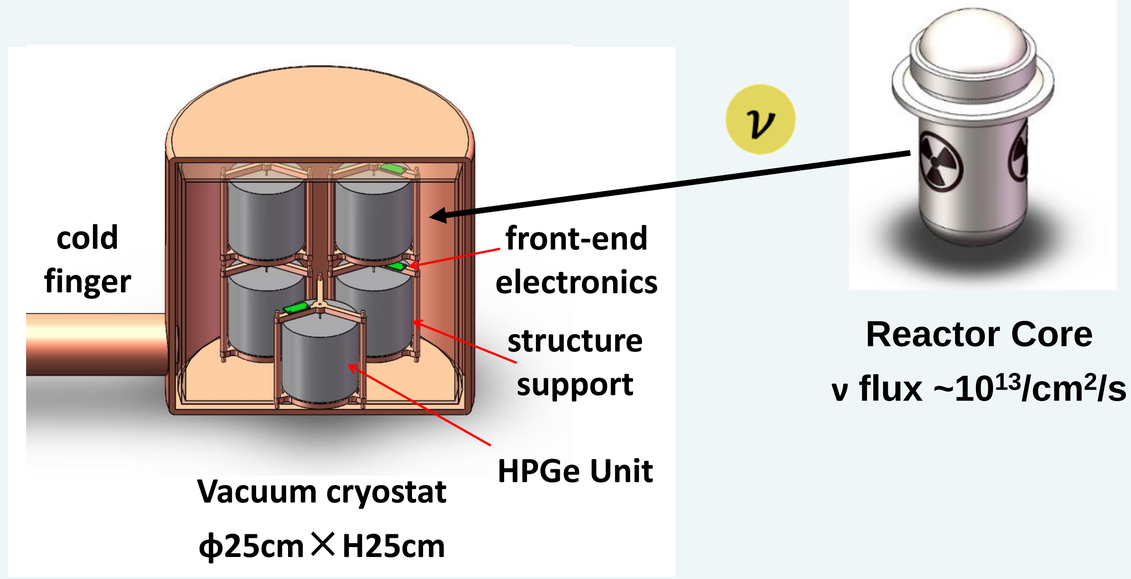
REactor neutrino COherent scattering Detection Experiment

Project Goals:

- Two Ge arrays (10 kg in total)
  - Energy threshold ~ 1 keVnr (~160 eVee)
  - ~ 500 CEvNS events/kg/year
  - Background level < 2 counts/kg/keV/day

Location:

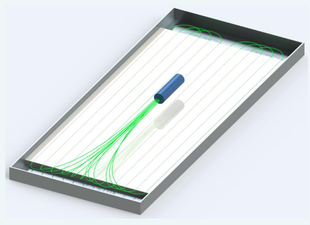
- Sanmen NPP@ Taizhou, Zhejiang, China
  - Thermal power ~ 3.4 GW
  - 25 meters from the core
  - Neutrino flux ~ 10^{13} cm^{-2} s^{-1}



Background Control:

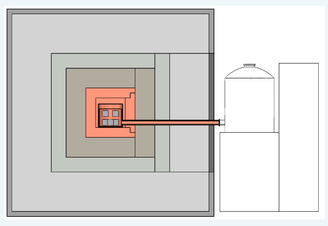
- Shielding design
  - Anti coincidence efficiency of Cosmic ray:>99%
  - Gamma flux: reduced by 5 orders of magnitude
  - Neutron flux: reduced by 3 orders of magnitude

Conceptual design of Muon veto system



Muon veto detector unit

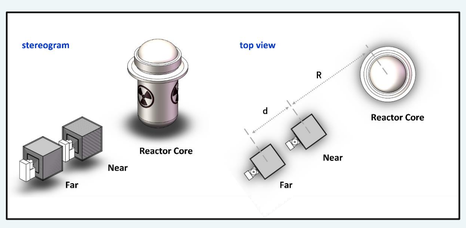
Muon veto system



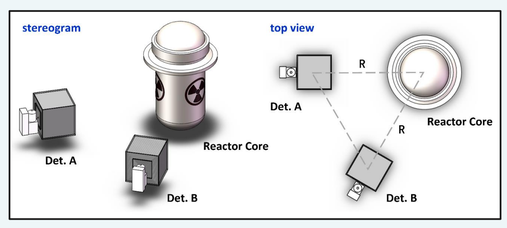
shielding system

Reduce systematic uncertainty:

- **Joint measurements** of 2 detector arrays, to reduce the uncertainty of neutrino flux
- **Need more accurate measurement of the quenching factor** at low energy, which can reach ~10%-20% to systematic uncertainty

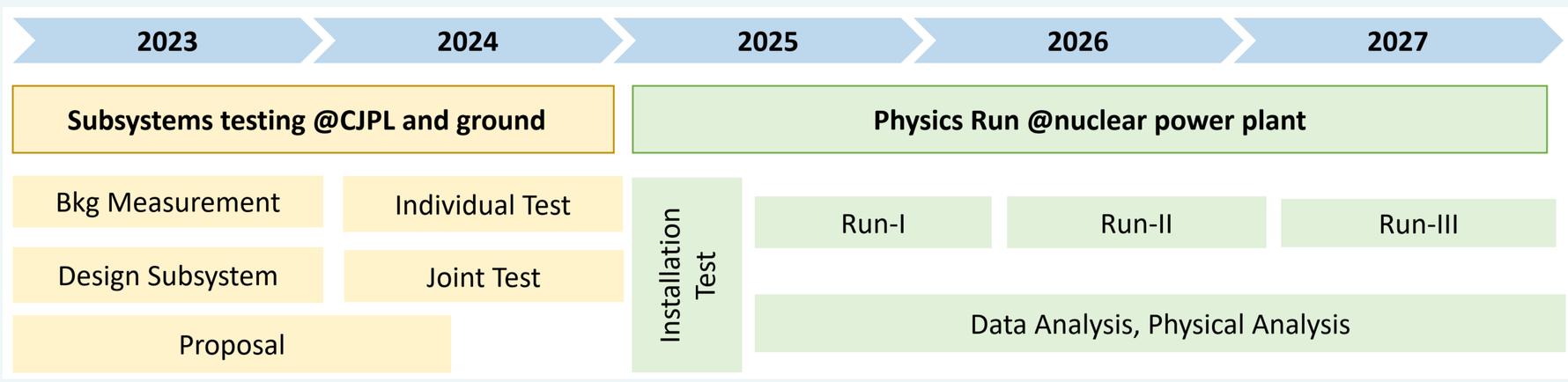


①/② collinear measurement modes

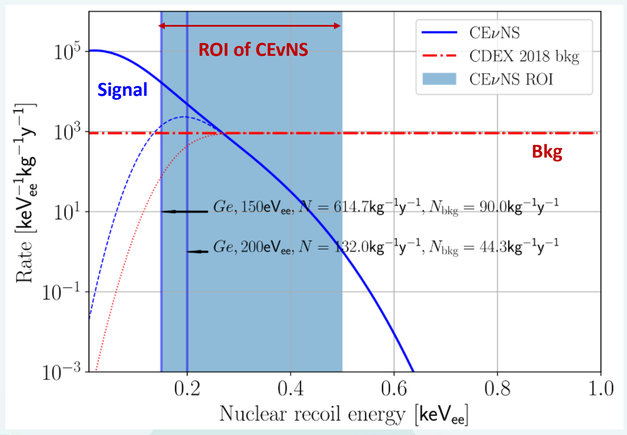


③ isometric measurement mode

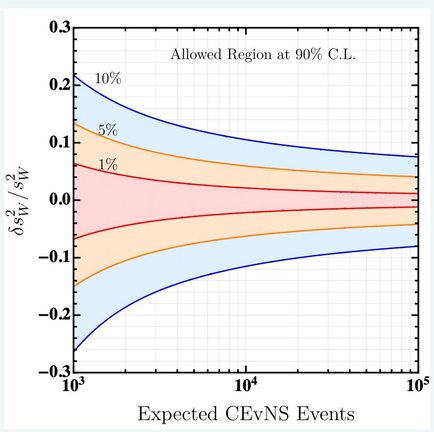
RECODE Roadmap & Schedule:



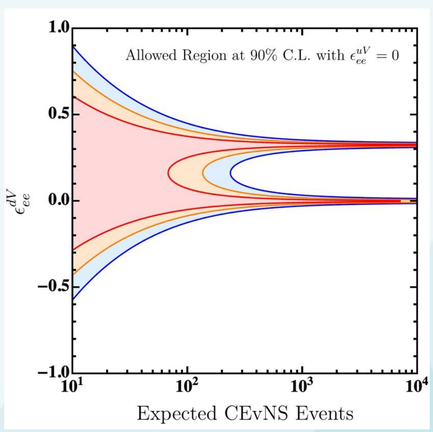
RECODE Prospects:



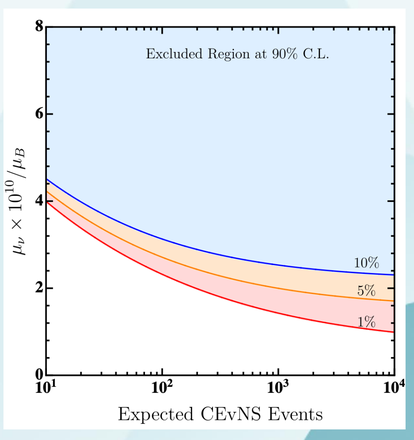
Expected CEvNS spectrum in Ge



Weak Mixing Angle



Neutrino NSI



Neutrino Magnetic Moment

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