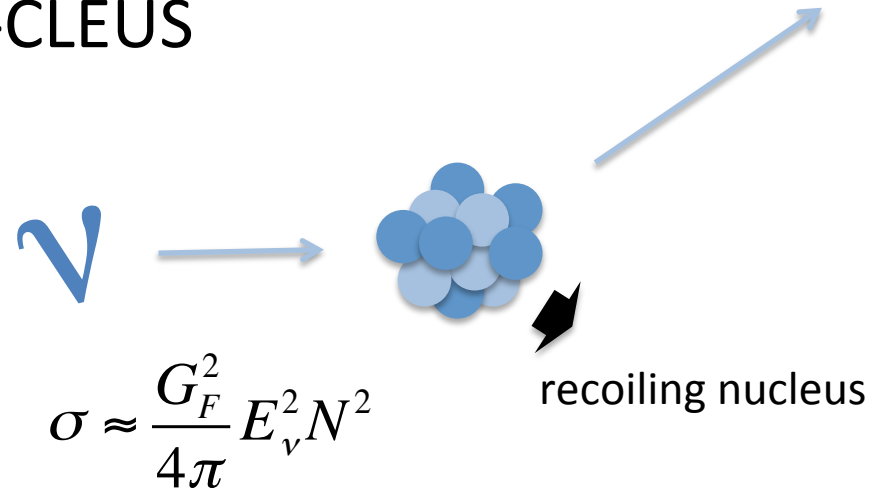


Exploring Coherent Neutrino-Nucleus Scattering with NU-CLEUS

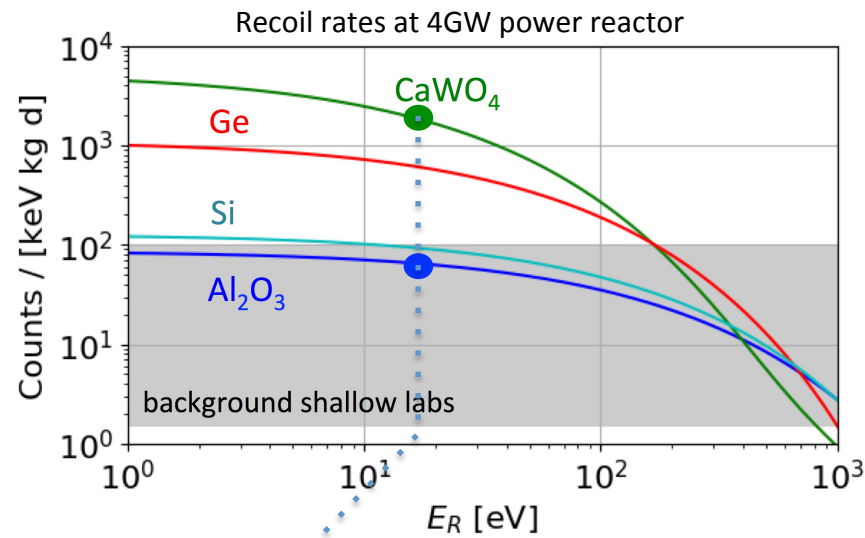
- Weak neutral current process
- Flavour insensitive
- No energy threshold

Potential: high cross-section
Challenge: tiny recoil energies



1 count/day/10g

Miniaturization of neutrino detectors



50-1000 in signal/background

Energy thresholds:

NU-CLEUS

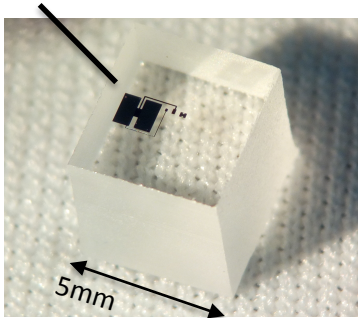
other cryogenic

conventional

Exploring Coherent Neutrino-Nucleus Scattering with NU-CLEUS

Gram-Scale Cryogenic Calorimeters

transition-edge-sensor (TES)



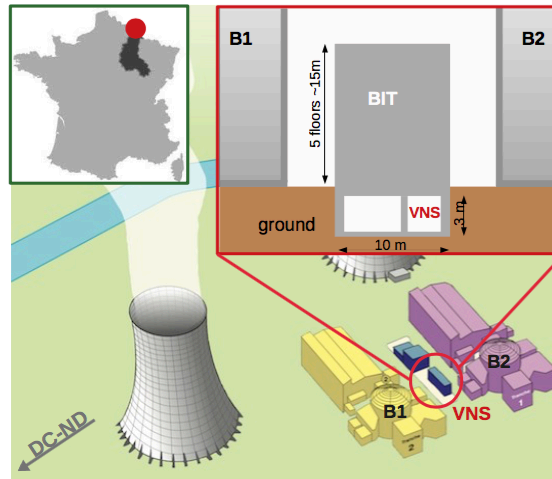
0.5g Al₂O₃ prototype

Demonstrated technology: R. Strauss et al., *Phys. Rev. D* **96**, 022009 (2017)

- World-best energy threshold for nuclear recoils, $E_{\text{th}} = (19.7 \pm 0.8) \text{ eV}$
 - Suitable for above-ground operation
 - Calorimetric measurement – precise knowledge of energy scale
- Explore neutrino physics at unprecedentedly low energies!

The Very-Near-Site at the Chooz nuclear power plant

- Suitable site in between the 4.25GW reactor cores (70m and 100m)
- Established relation of the CEA group to the reactor company
- Background characterization ongoing
- Neutron and muon measurements performed on-site (CEA+TUM+MPP)
- Full MC simulation campaign in preparation



NU-CLEUS opens the door to

- Neutrino physics at the low-energy and precision frontier
- Miniaturization of neutrino detectors