

Neutron Electric Dipole Moment Search with a Spallation Ultracold Neutron Source at TRIUMF



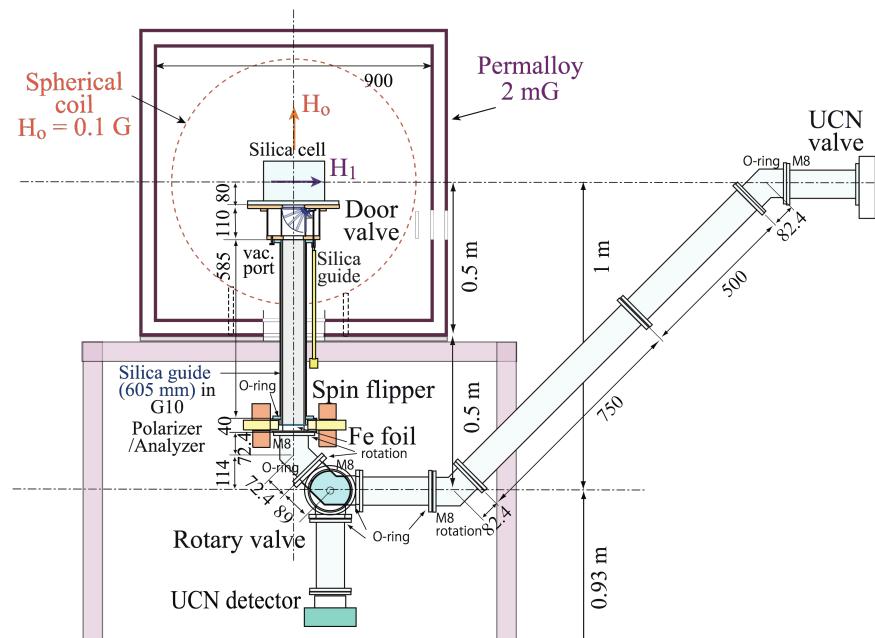
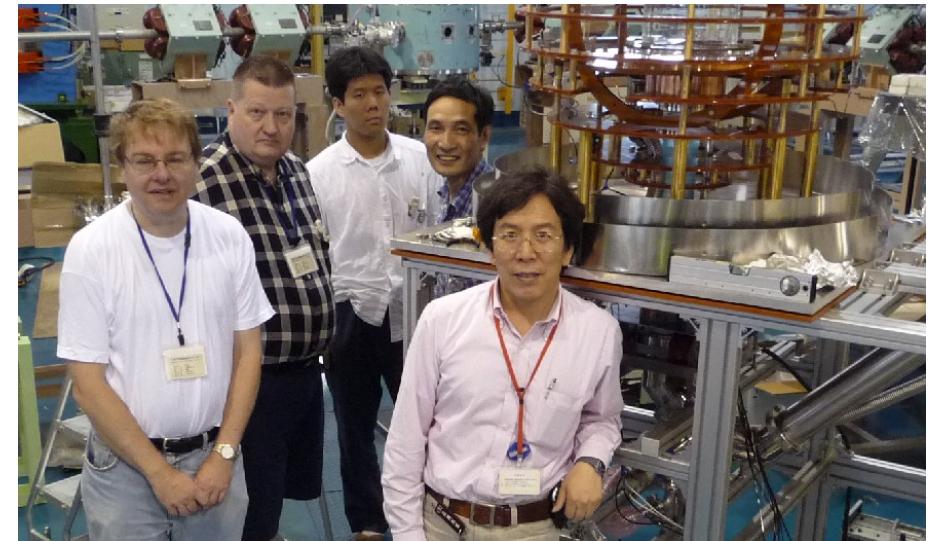
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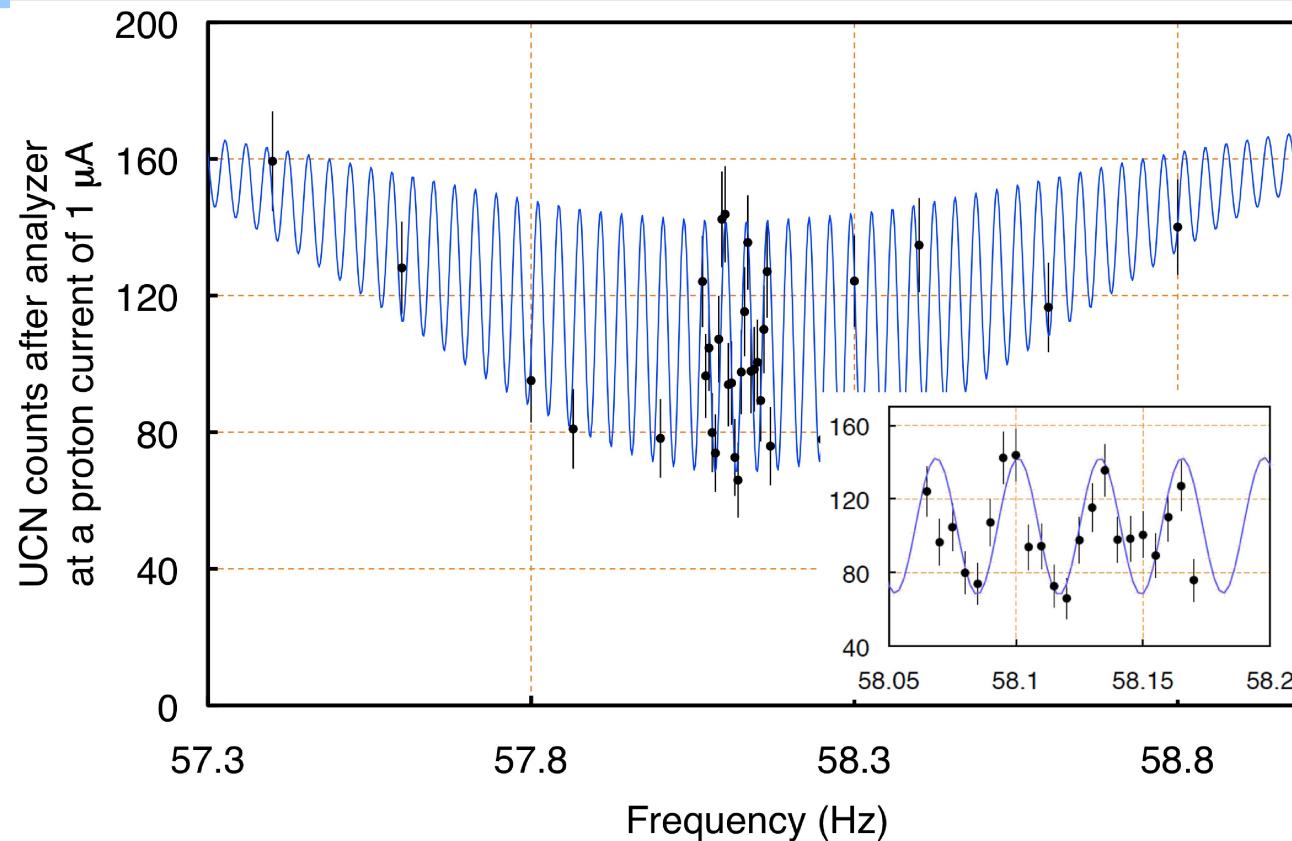
(KEK, Titech, Winnipeg, Manitoba, TRIUMF, NCSU,
RCNP, UNBC, UBC, Osaka)

Japan-Canada nEDM experiment

- Spherical coil for DC field
- Xe-129 nuclear-spin buffer-gas comagnetometer
- Room-temp experiment, keeping EDM cell size small, anticipating gains in UCN density
- Modern magnetic shielding, cost reduced with cell size
- Superfluid He-4 UCN source
- Basic prototype in operation



Key R&D Results

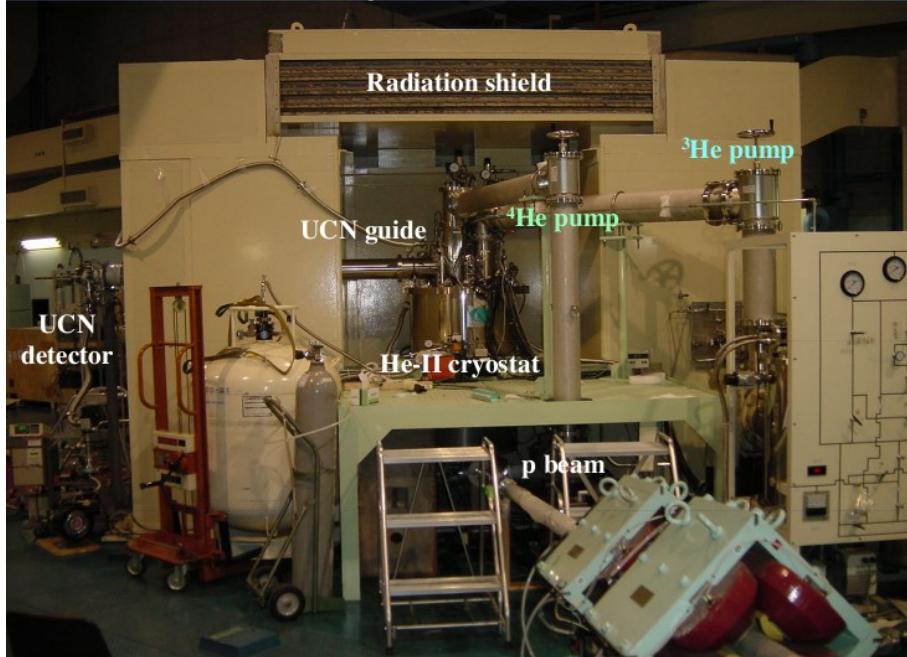


- UCN density at source exit $19 \text{ UCN}/\text{cm}^3$.
- UCN lifetimes in source and experiment $\sim 100 \text{ s}$.
- UCN polarization holding times to $\sim 1000 \text{ s}$.
- UCN free spin-precession times to $\sim 40 \text{ s}$.

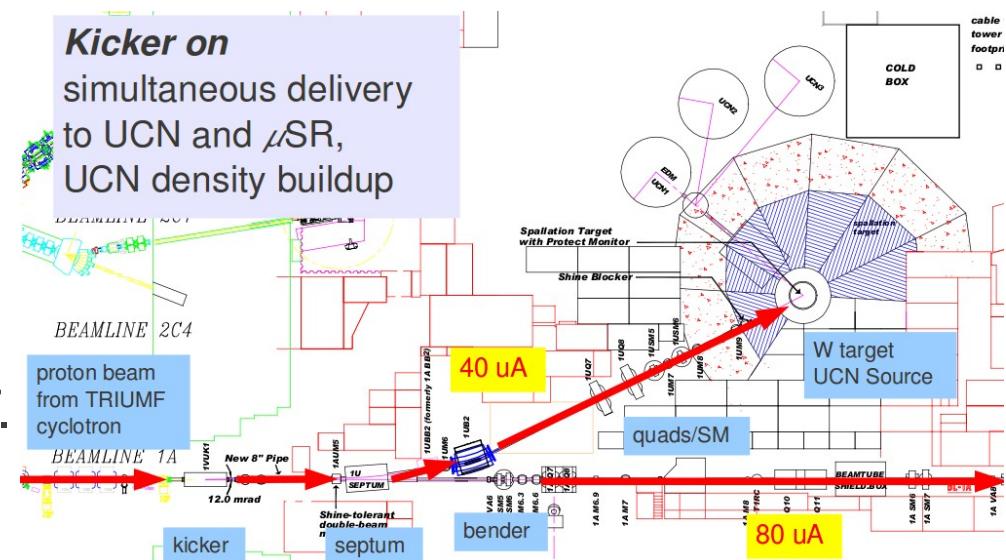
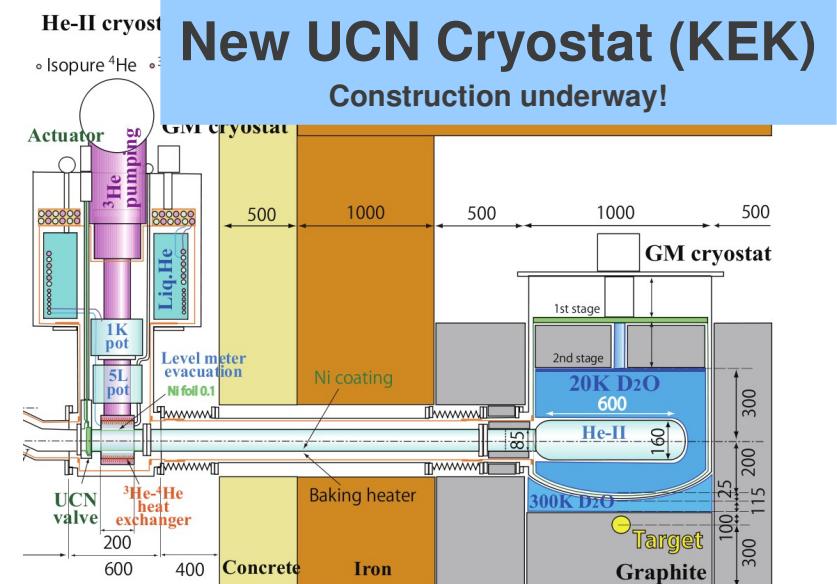
Recent Highlights from TRIUMF

- MOU signed January 2011
- Kicker magnet design completed August 2011
- Bender magnet under construction (KEK); septum (KEK), beamline design ongoing.
- Target workshop August 2011; design ongoing
- Shielding simulation/design ongoing
- n-EDM magnetic field simulations completed August 2011.
- New R&D results and requests for Xe-129 comagnetometer; requests for detectors, cryo equipment.

Schedule and Goals



- RCNP Phase (-2014)
 - Goal $d_n < 1 \times 10^{-26}$ e-cm
- TRIUMF Phase (2015-)
 - Goal $d_n < 1 \times 10^{-27}$ e-cm by 2017.
 - Improve to $d_n < 1 \times 10^{-28}$ e-cm.



Japan-Canada nEDM experiment



Osaka, Feb. 2011