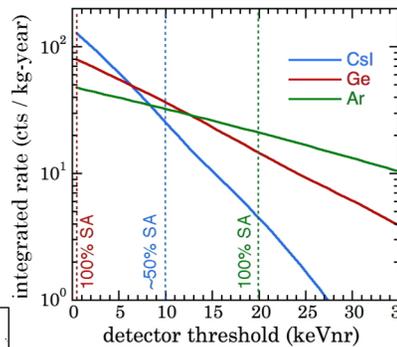
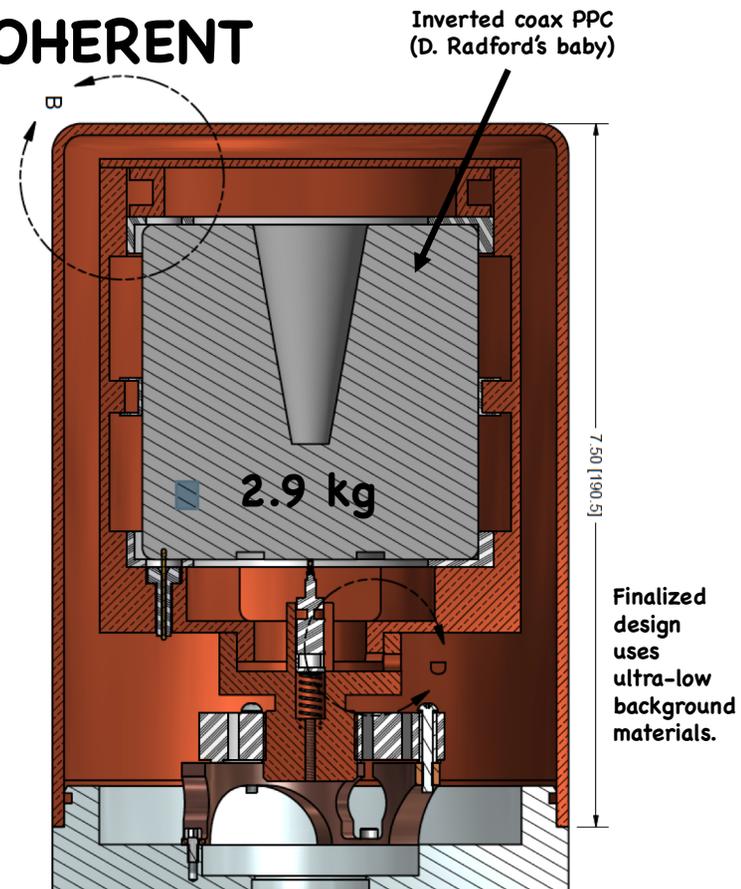
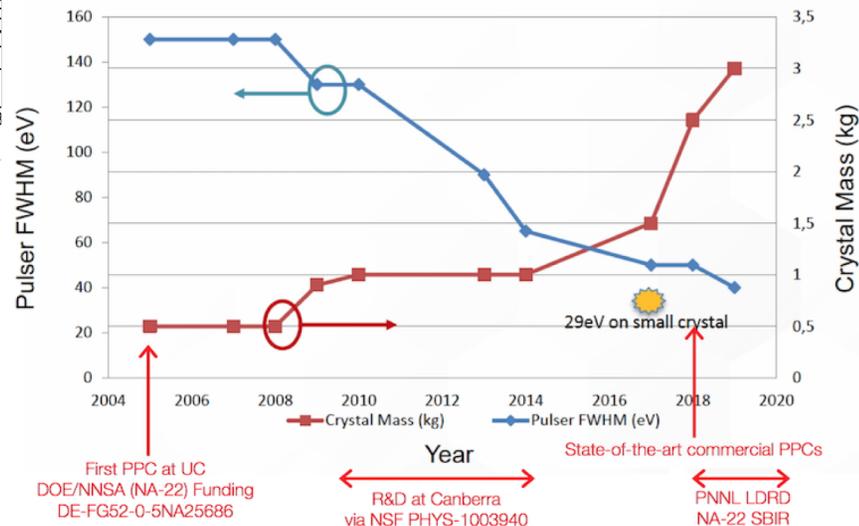
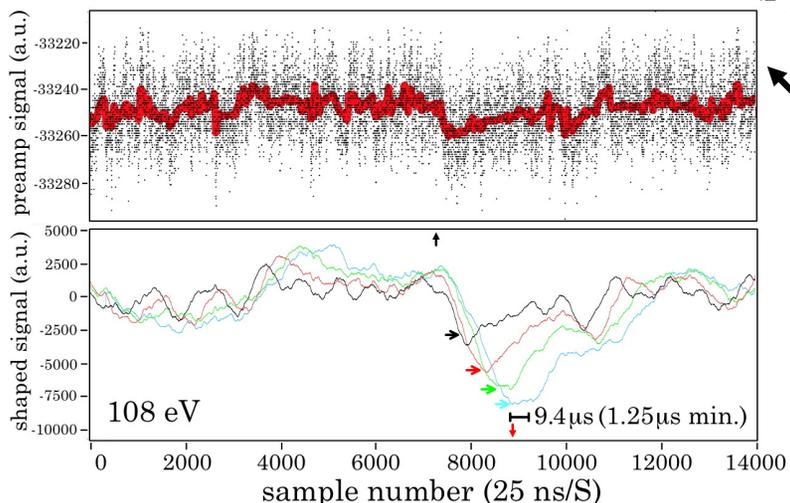


New germanium target at COHERENT

- Use state-of-the-art PPC Ge technology to perform a *precision* measurement of CEvNS. >800 events/yr from small array, with a signal/background of ~ 15 (this was $\sim 1/4$ for CsI[Na] first COHERENT result).
- Demonstrated analysis threshold of $\sim 140\text{eVee}/650\text{eVnr}$ (>80% SA, no false positives) allows measurement of full CEvNS recoil spectrum. Accompanying ongoing effort in quenching factor characterization.
- Improved sensitivity to ν electromagnetic properties, non-standard ν interactions, MiniBooNE/LSND anomaly (steriles), DM models...
- Two first detectors (6 kg) already funded at University of Chicago through DARPA and NSF, third to be requested from NNSA consortium. Support from ORNL and NCSU on shield design needed. Demonstration of threshold and background in 2018 (1st detector Oct. 2018, 2nd Feb 2019). Start of data-taking at SNS summer 2019.
- Best possible understanding of quenching factor required. Parasitic measurement of NIN cross-section through new internal veto.

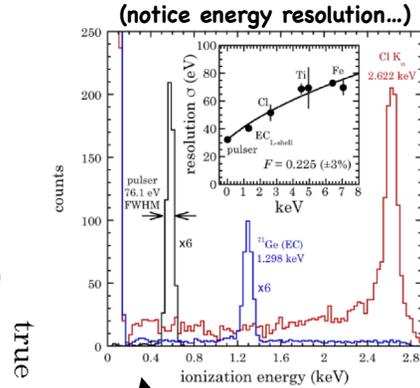
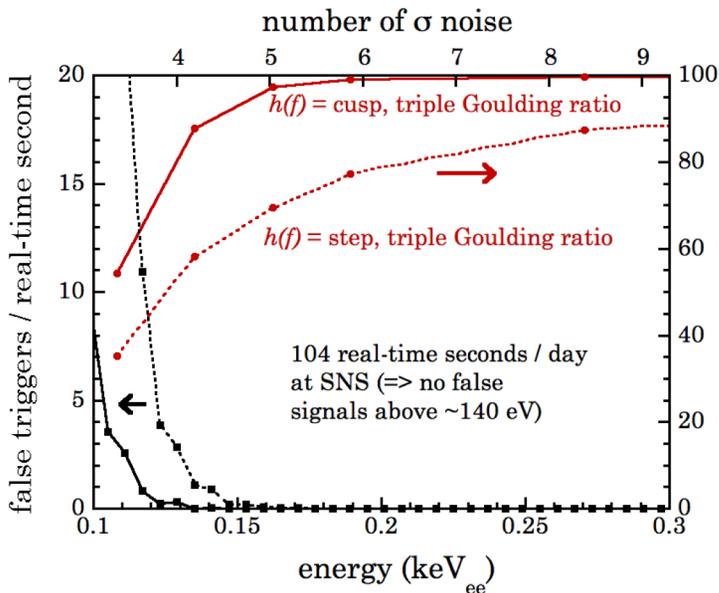
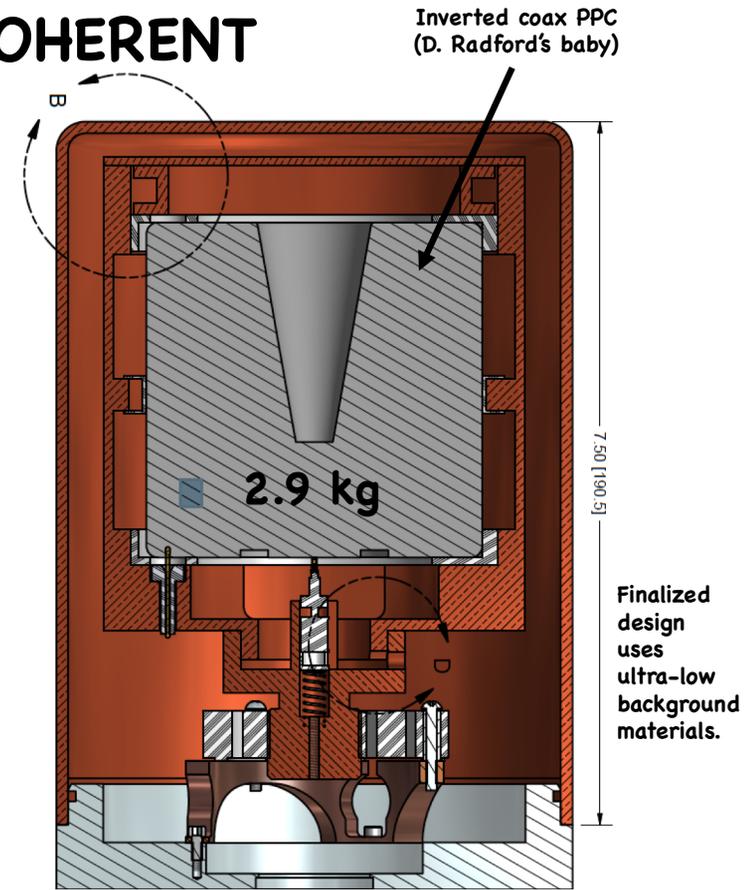


PPC ability to detect sub-keV nuclear recoils provides advantageous CEvNS rate per target mass.

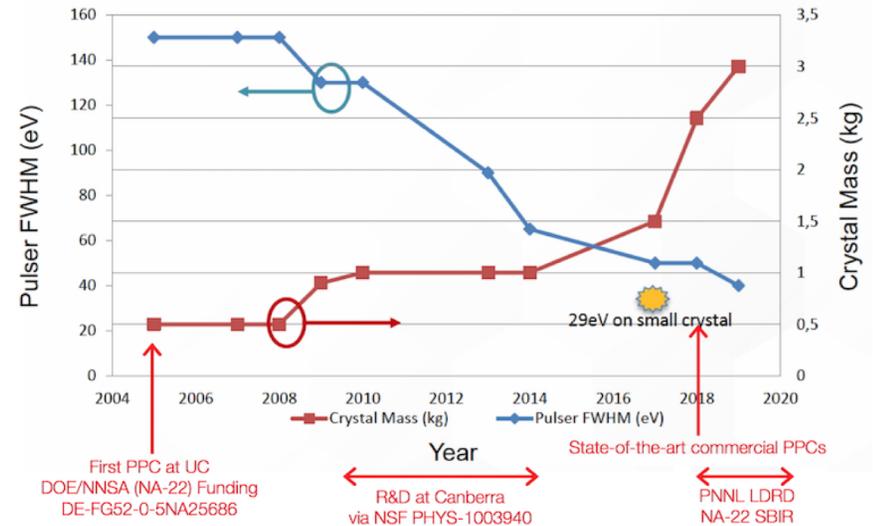


New germanium target at COHERENT

- Use state-of-the-art PPC Ge technology to perform a *precision* measurement of CEvNS. >800 events/yr from small array, with a signal/background of ~ 15 (this was $\sim 1/4$ for CsI[Na] first COHERENT result).
- Demonstrated analysis threshold of $\sim 140\text{eV}_{ee}/650\text{eV}_{nr}$ (>80% SA, no false positives) allows measurement of full CEvNS recoil spectrum. Accompanying ongoing effort in quenching factor characterization.
- Improved sensitivity to ν electromagnetic properties, non-standard ν interactions, MiniBooNE/LSND anomaly (steriles), DM models...
- Two first detectors (6 kg) already funded at University of Chicago through DARPA and NSF, third to be requested from NNSA consortium. Support from ORNL and NCSU on shield design needed. Demonstration of threshold and background in 2018 (1st detector Oct. 2018, 2nd Feb 2019). Start of data-taking at SNS summer 2019.
- Best possible understanding of quenching factor required. Parasitic measurement of NIN cross-section through new internal veto.

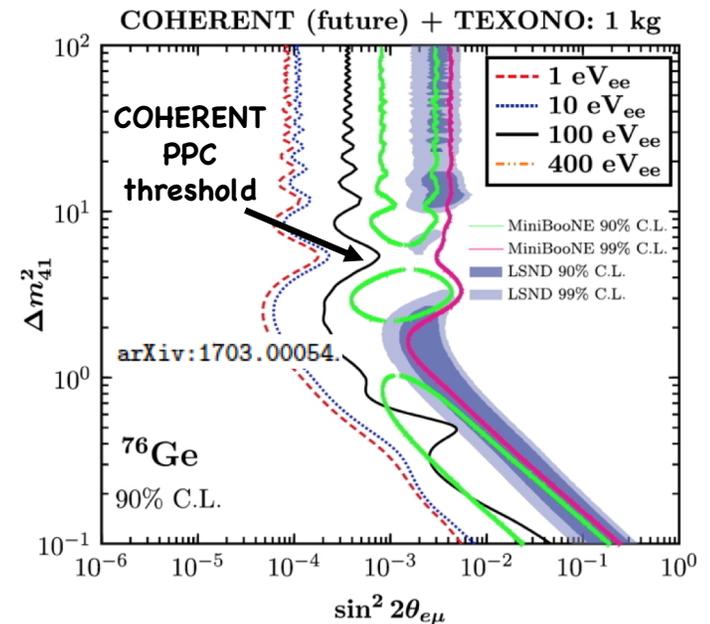
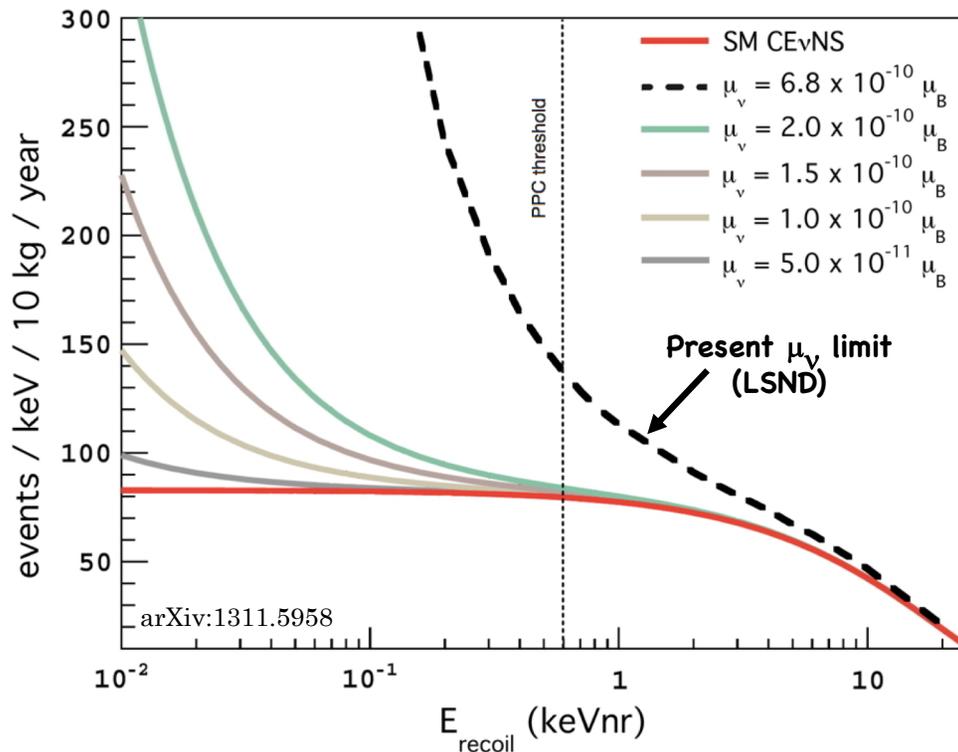
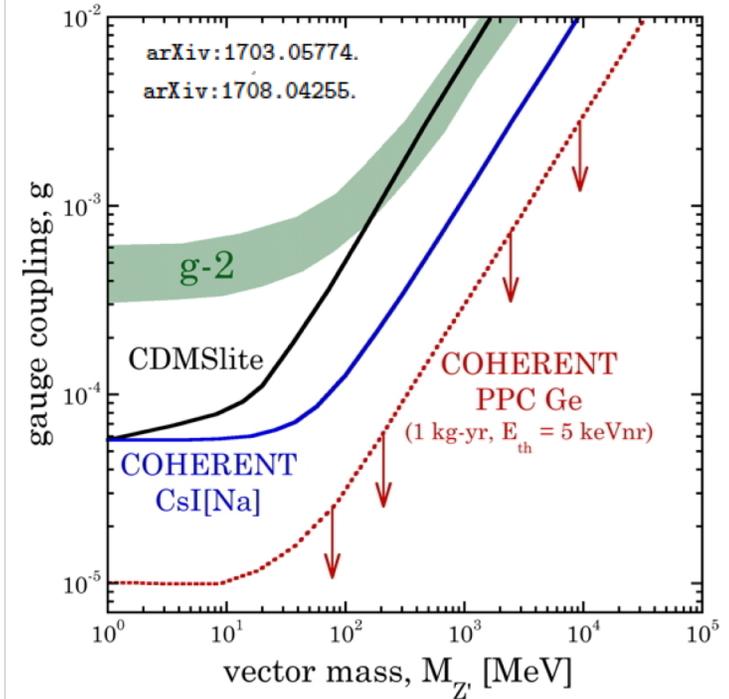


Ongoing studies of quenching factor and signal identification algorithms using small PPC with same noise specs (70eV FWHM) as 3kg COHERENT PPCs



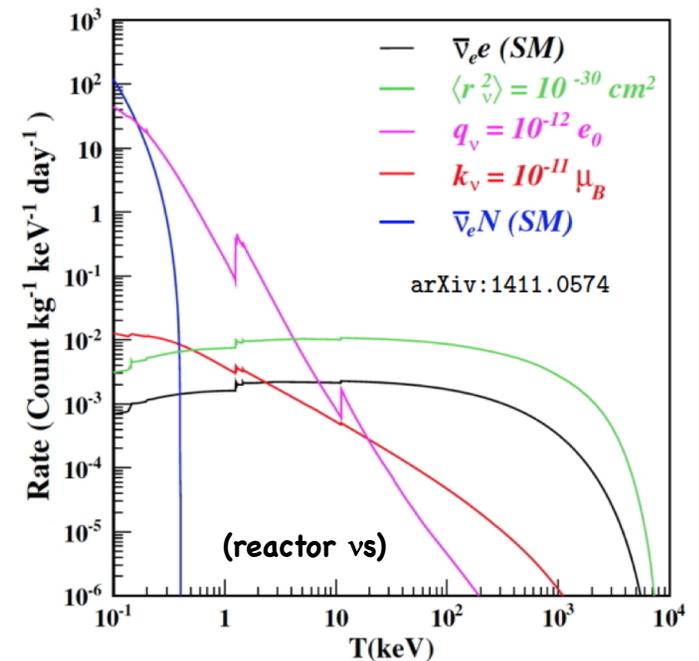
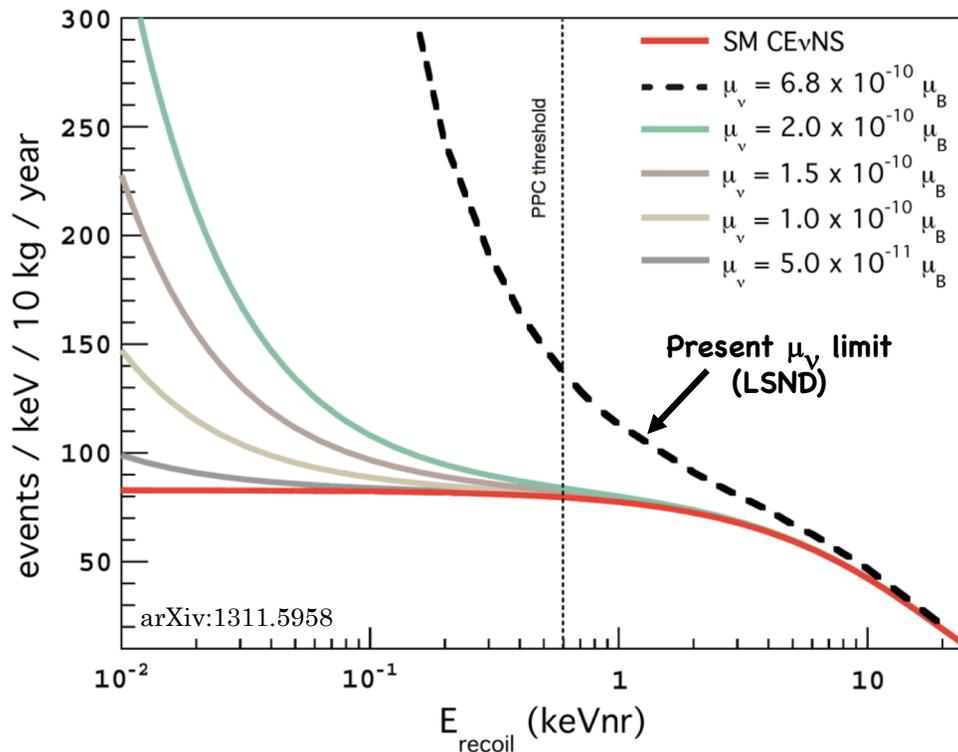
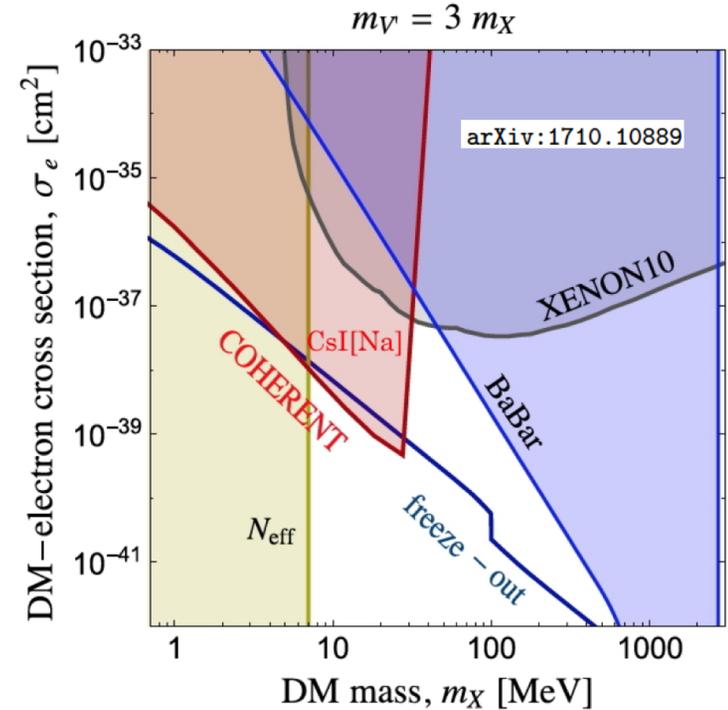
New germanium target at COHERENT

- Use state-of-the-art PPC Ge technology to perform a *precision* measurement of CEvNS. >800 events/yr from small array, with a signal/background of ~ 15 (this was $\sim 1/4$ for CsI[Na] first COHERENT result).
- Demonstrated analysis threshold of $\sim 140\text{eVee}/650\text{eVnr}$ (>80% SA, no false positives) allows measurement of full CEvNS recoil spectrum. Accompanying ongoing effort in quenching factor characterization.
- Improved sensitivity to ν electromagnetic properties, non-standard ν interactions, MiniBooNE/LSND anomaly (steriles), DM models...
- Two first detectors (6 kg) already funded at University of Chicago through DARPA and NSF, third to be requested from NNSA consortium. Support from ORNL and NCSU on shield design needed. Demonstration of threshold and background in 2018 (1st detector Oct. 2018, 2nd Feb 2019). Start of data-taking at SNS summer 2019.
- Best possible understanding of quenching factor required. Parasitic measurement of NIN cross-section through new internal veto.



New germanium target at COHERENT

- Use state-of-the-art PPC Ge technology to perform a *precision* measurement of CEvNS. >800 events/yr from small array, with a signal/background of ~ 15 (this was $\sim 1/4$ for CsI[Na] first COHERENT result).
- Demonstrated analysis threshold of $\sim 140\text{eVee}/650\text{eVnr}$ (>80% SA, no false positives) allows measurement of full CEvNS recoil spectrum. Accompanying ongoing effort in quenching factor characterization.
- Improved sensitivity to ν electromagnetic properties, non-standard ν interactions, MiniBooNE/LSND anomaly (steriles), DM models...
- Two first detectors (6 kg) already funded at University of Chicago through DARPA and NSF, third to be requested from NNSA consortium. Support from ORNL and NCSU on shield design needed. Demonstration of threshold and background in 2018 (1st detector Oct. 2018, 2nd Feb 2019). Start of data-taking at SNS summer 2019.
- Best possible understanding of quenching factor required. Parasitic measurement of NIN cross-section through new internal veto.



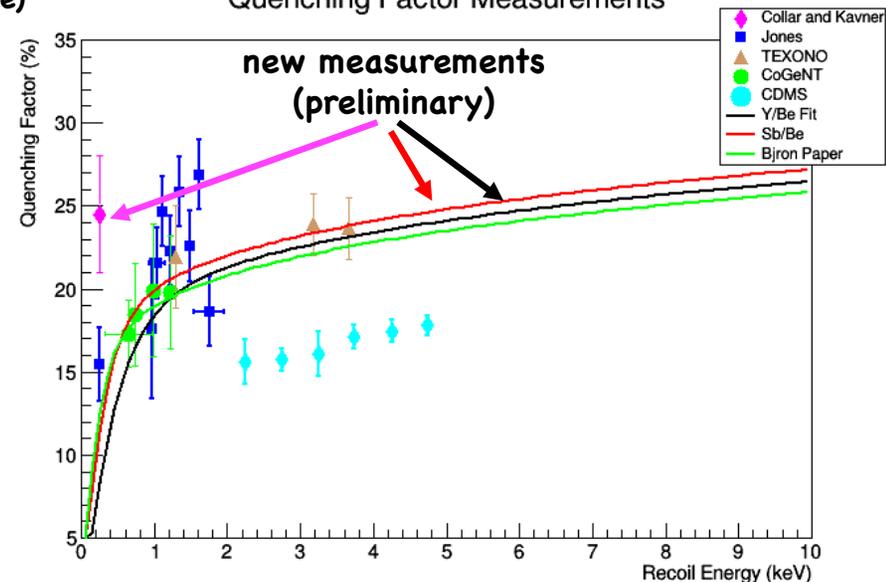
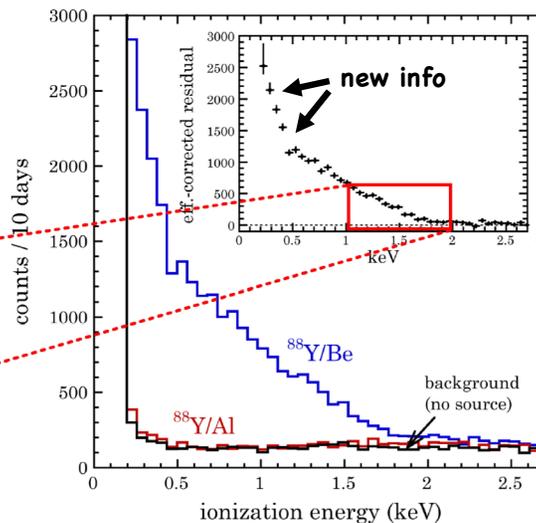
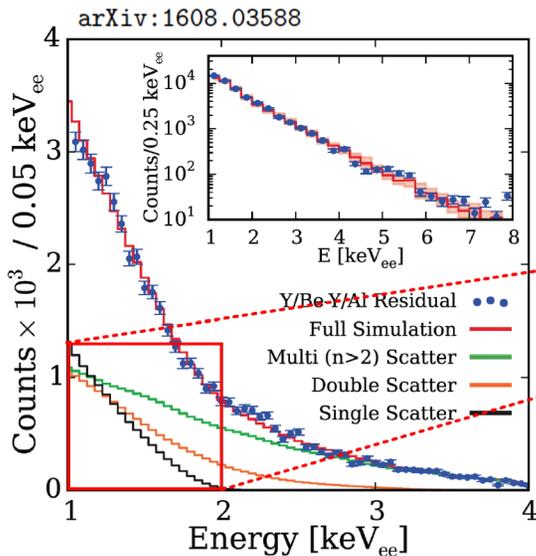
New germanium target at COHERENT

- Use state-of-the-art PPC Ge technology to perform a *precision* measurement of CEvNS. >800 events/yr from small array, with a signal/background of ~ 15 (this was $\sim 1/4$ for CsI[Na] first COHERENT result).
- Demonstrated analysis threshold of $\sim 140\text{eV}_{ee}/650\text{eV}_{nr}$ (>80% SA, no false positives) allows measurement of full CEvNS recoil spectrum. Accompanying ongoing effort in quenching factor characterization.
- Improved sensitivity to ν electromagnetic properties, non-standard ν interactions, MiniBooNE/LSND anomaly (steriles), DM models...
- Two first detectors (6 kg) already funded at University of Chicago through DARPA and NSF, third to be requested from NNSA consortium. Support from ORNL and NCSU on shield design needed. Demonstration of threshold and background in 2018 (1st detector Oct. 2018, 2nd Feb 2019). Start of data-taking at SNS summer 2019.
- Best possible understanding of quenching factor required. Parasitic measurement of NIN cross-section through new internal veto.



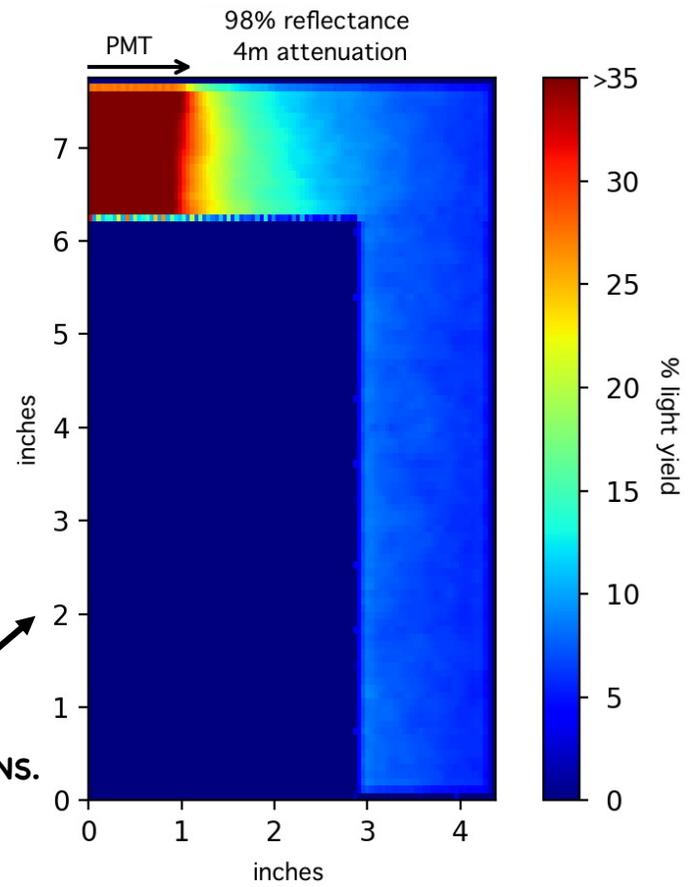
FOUR new measurements
of low-energy Ge quenching
factor at UC
(one additional at Duke)

Quenching Factor Measurements



New germanium target at COHERENT

- Use state-of-the-art PPC Ge technology to perform a *precision* measurement of CEvNS. >800 events/yr from small array, with a signal/background of ~ 15 (this was $\sim 1/4$ for CsI[Na] first COHERENT result).
- Demonstrated analysis threshold of $\sim 140\text{eVee}/650\text{eVnr}$ (>80% SA, no false positives) allows measurement of full CEvNS recoil spectrum. Accompanying ongoing effort in quenching factor characterization.
- Improved sensitivity to ν electromagnetic properties, non-standard ν interactions, MiniBooNE/LSND anomaly (steriles), DM models...
- Two first detectors (6 kg) already funded at University of Chicago through DARPA and NSF, third to be requested from NNSA consortium. Support from ORNL and NCSU on shield design needed. Demonstration of threshold and background in 2018 (1st detector Oct. 2018, 2nd Feb 2019). Start of data-taking at SNS summer 2019.
- Best possible understanding of quenching factor required. Parasitic measurement of NIN cross-section through new internal veto.



Ongoing validation of new approach at NIN rejection, imposed by space limitations at SNS.

(turn lemons into lemonade: definitive measurement of NIN cross-section, of interest for HALO)

