Exploring the Advantages of an Undoped, Cryogenic CsI Detector for CEvNS Experiments at the SNS with COHERENT

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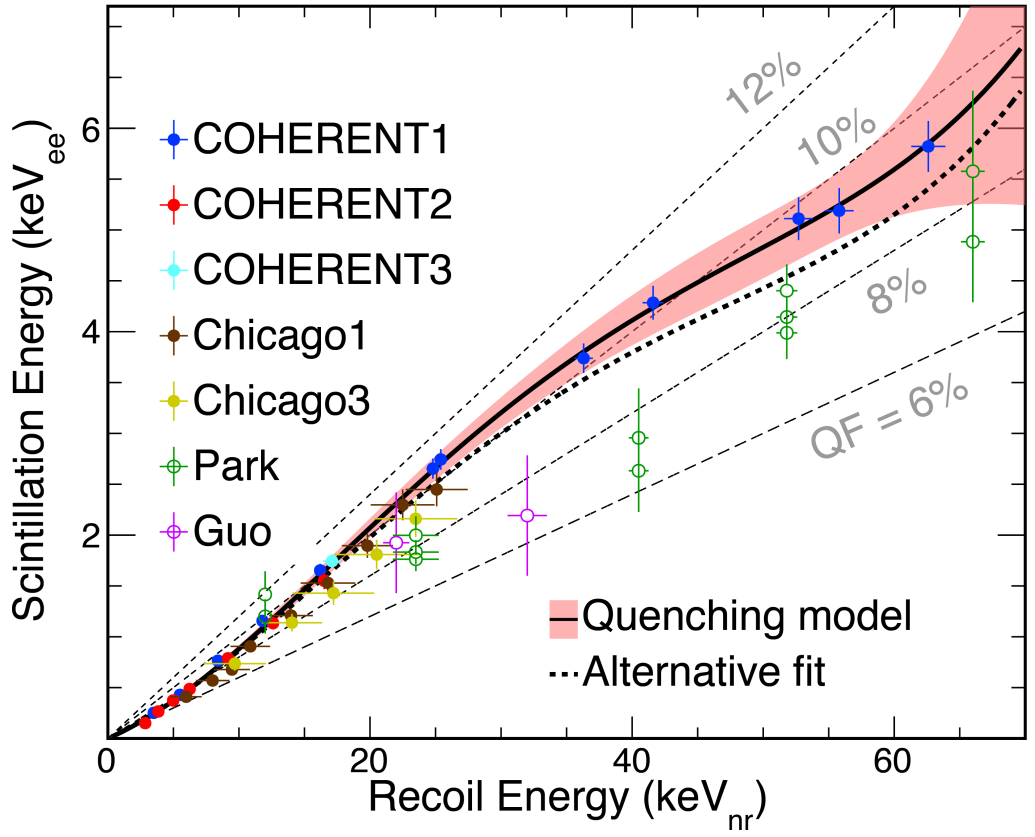
History

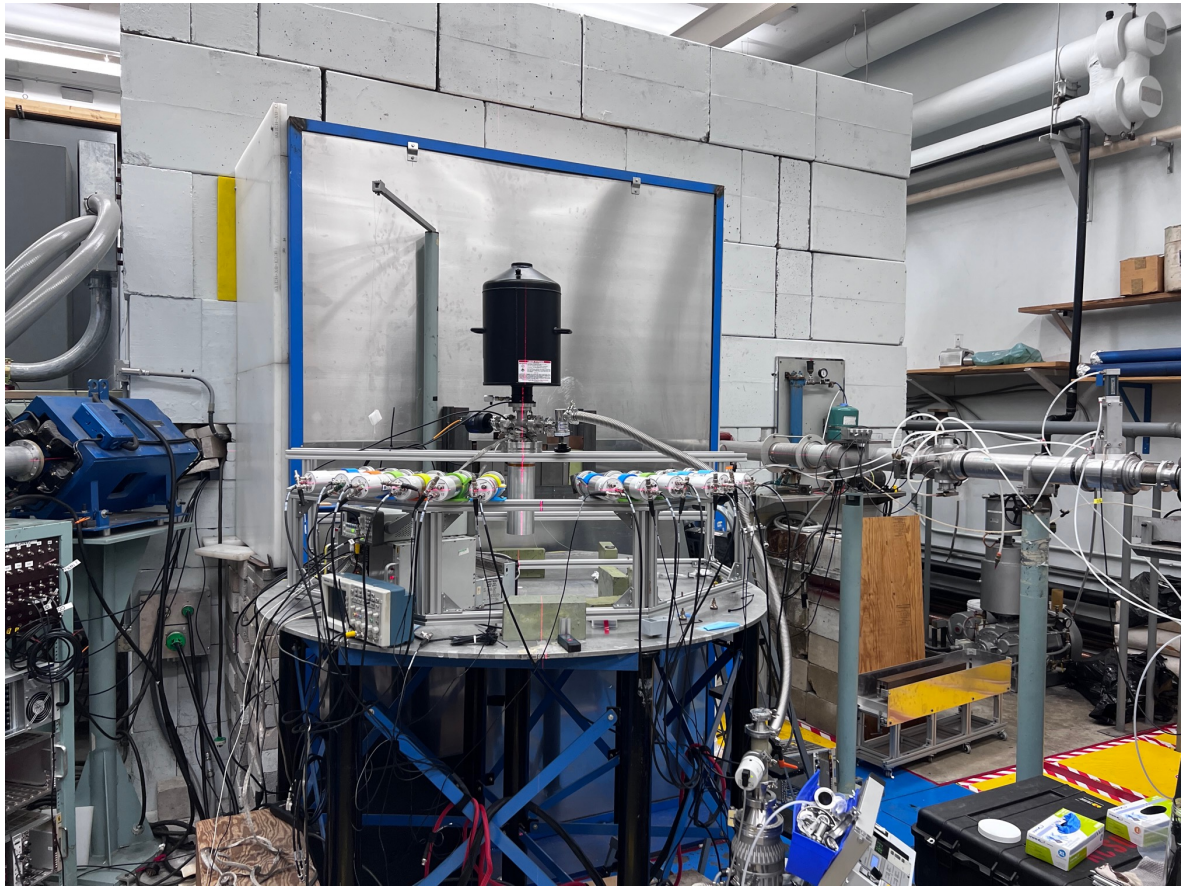
- Refer back to D. Parno's talk
- Remember that the first measurement on CsI achieved:
  - a light yield of **13.35 PE/keV**
  - a quenching factor of **~8-10%**
  - a threshold of **~8 keV$_{nr}$ or ~700 eV$_{ee}$**
- How do we improve?

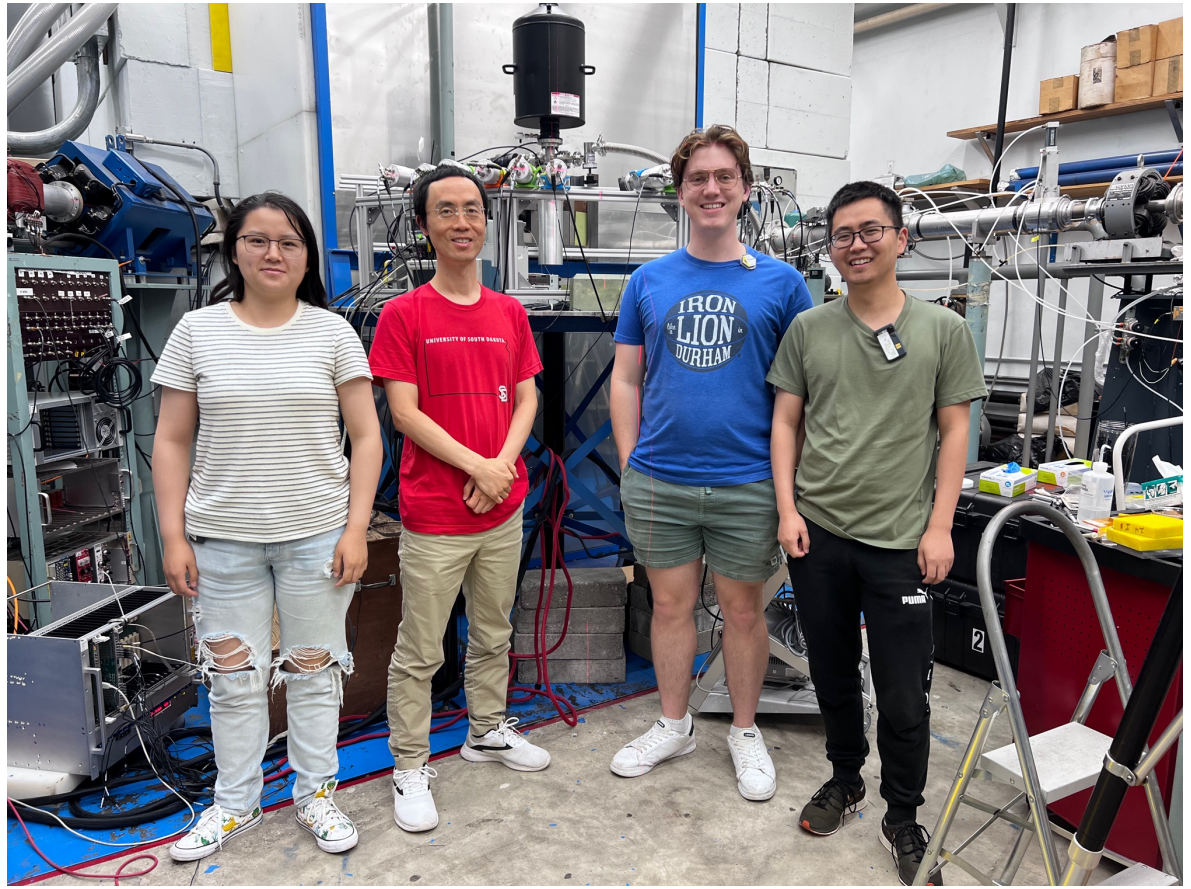
Quenching Factors

- Energy-dependent (and detector-dependent) measure of detector response to a particular nuclear recoil
- Changing crystal properties, such as dopants and temperature, affects the quenching factor
- Currently undertaking a campaign to measure QF on 40 K CsI at TUNL



Quenching Factors





Future!

- Increased light yield and QF will lower the threshold to roughly **500 eV_{nr}**
- This will also improve detector timing and energy resolution
- Work underway to measure light yield and quenching factor on 40 K CsI