

Silicon detectors with non destructive readout for dark matter and neutrinos

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Why to push for floating diffusion technology

- Floating diffusion is a unique technologies that have shown single charge counting capabilities in the entire dynamic range (eV-energy scale).
- We know how to fabricate the technology with very small Dark current contribution (currently 10^{-4} e-/pix/day).
- There is a strong scientific case to push for this technology for larger dark matter, neutrino experiments, and other smaller experiments.

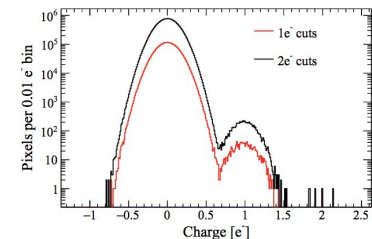
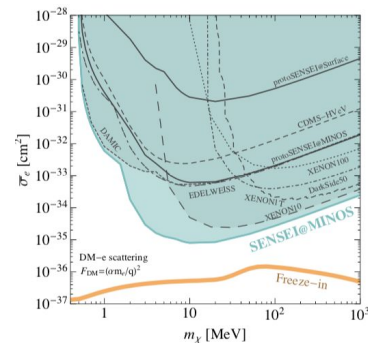


FIG. 3. The pixel charge spectra (after selection cuts) used for the $1e^-$ and $2e^-$ analyses. There are no $3e^-$ or $4e^-$ events.



Opportunities for Fermilab

- Large community interested on this technology in the US and abroad (for Dark Matter and neutrinos)
- New snowmass commission for CEvNS channel.
- Fermilab is currently leading: sensor development, readout system, low background experiments.

We have a clear path on how to move forward

- Reduce readout time of the sensors:
 - Move to CMOS sensors: increase node sensibility and structure flexibility.
 - Lower noise on-chip electronics.
 - Topologies with more channels. pin
- Keep fabrication techniques that allow for low DC. Development of new DC measurements and operation methods.