

Diffusion Global Fit Updates

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Diffusion data updates

► Additional data found

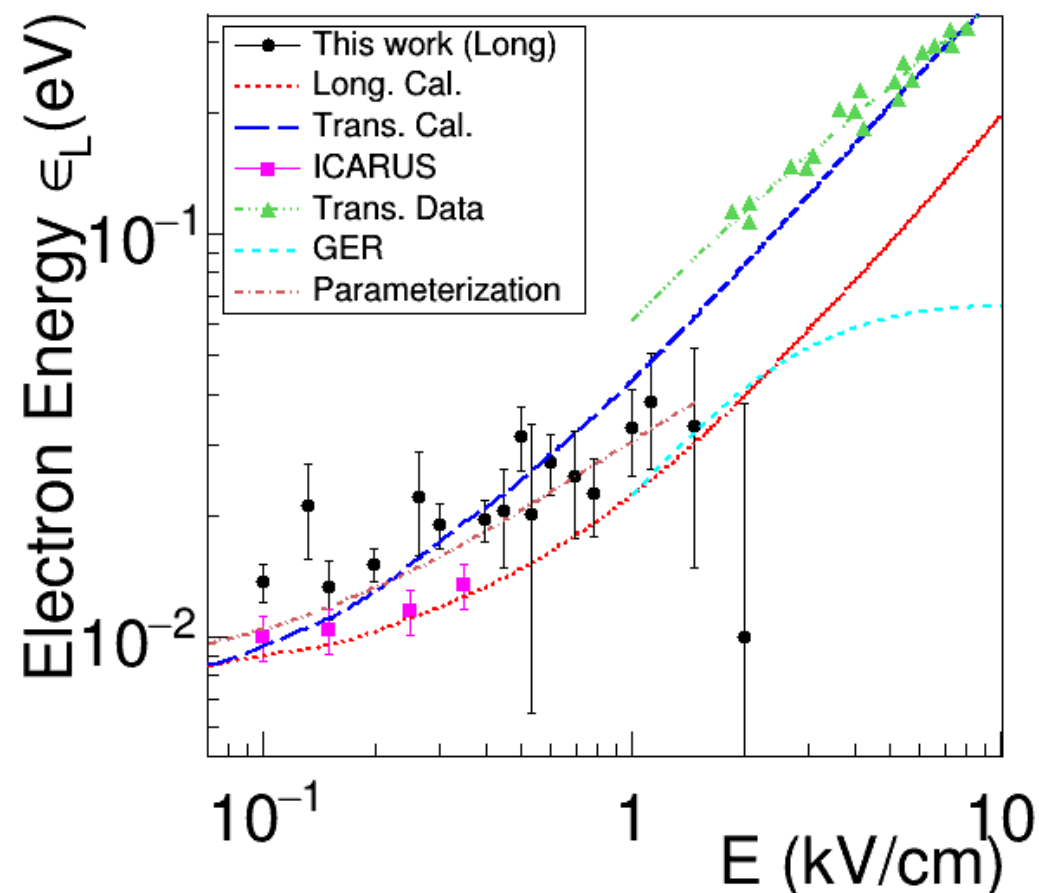
- Measurement of the Longitudinal Diffusion of Ionization Electrons in the MicroBooNE Detector, **MicroBooNE** 2021, <https://arxiv.org/pdf/2104.06551>
 - $D_L = 3.74^{+0.28}_{-0.29} \text{ cm}^2/\text{s}$ at 273.9 V/cm at $89.4 \pm 0.2 \text{ K}$
- Electroluminescence pulse shape and electron diffusion in liquid argon measured in a dual-phase TPC, **DarkSide**, 2018 <https://arxiv.org/pdf/1802.01427> at 89.2K
 - 100 V/cm, $D_L = 4.35 \pm 0.05 \text{ cm}^2/\text{s}$
 - 150 V/cm, $D_L = 4.21 \pm 0.04 \text{ cm}^2/\text{s}$
 - 200 V/cm, $D_L = 4.05 \pm 0.04 \text{ cm}^2/\text{s}$
- Electron Diffusion in the ProtoDUNE-SP LArTPC, **ProtoDUNE** 2021, <https://indico.fnal.gov/event/44492/contributions/214335/>
 - At 500 V/cm, $D_L = 3.91 \pm 0.13 \text{ cm}^2/\text{s}$ at 87.68 K
- SBND, work in progress, no reportable data at this moment, Mike Mooney will keep me posted when an update is available

Update Fit

$$D_L = \frac{\mu \epsilon_L}{e}$$

$$\epsilon_L = \frac{b_0 + b_1 E + b_2 E^2}{1 + (b_1/b_0)E + b_3 E^2} \left(\frac{T}{T_1} \right)$$

b0	0.0075
b1	742.9
b2	3269.6
b3	31678.2
Chi-sq/DOF	1.47



- The global fit results are reduced with the new data points

