ID contributo: **407** Tipo: **Poster**

Differentiable surrogate model for photon propagation in a liquid argon time projection chamber

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Many current and future accelerator neutrino oscillation experiments, such as DUNE, rely on liquid argon time projection chamber (LArTPC) as the primary detection technology, benefiting from the high light yield from the liquid argon scintillation. However, propagating the scintillation light from the production to the readout channels is typically computationally challenging. A common solution is to use a look-up table to represent the process. Detectors are increasing in size and number of readout channels, but the need to maintain O(10 cm) granularity for the look-up tables remains constant, leading to billions of parameters being required. Therefore, the look-up table approach is not very scalable. We propose to use SIREN, an implicit neural representation with periodic activation functions, to model photon propagation. It can reproduce the look-up table in 3D with high precision using orders of magnitude fewer parameters. In addition, using the differentiable nature of the SIREN model, we can optimize the photon propagation model directly with data.

Poster prize

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