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Leveraging Language Models for Particle Reconstruction

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Particle detectors play a pivotal role in the field of high-energy physics. Traditionally, detectors are characterized by their responses to various particle types, gauged through metrics such as energy or momentum resolutions. While these characteristics are instrumental in determining particle properties, they fall short of addressing the initial challenge of reconstructing particles.

We propose an innovative approach to enhance particle reconstruction by harnessing the power of language models. The idea is to tokenize the detector readout signals and train a language model to embed these detector readouts to a latent space as new detector data representations that capture the essence of particle interactions. The talk will show our preliminary results, providing a first proof-of-concept demonstration of solving the challenging particle tracking problem with language models. By leveraging language models, we aim to revolutionize particle reconstruction methodologies, opening new avenues for understanding particle detectors.

Significance

References

Experiment context, if any

Primary author: JU, Xiangyang (Lawrence Berkeley National Lab. (US))

Presenter: JU, Xiangyang (Lawrence Berkeley National Lab. (US))

Session Classification: Track 2: Data Analysis - Algorithms and Tools

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