Using Deep Learning in Event Reconstruction and Detector Design

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In this work, we present the usage of deep learning in event reconstruction, particularly in vertex and energy reconstruction. We will use the approach on the Daya Bay antineutrino detector. Using the results therefrom, we apply deep learning to detector designs, and found that the vertex and energy resolution of the Daya Bay detector has an exponential relationship with the number of photomultiplier tubes (PMT). The placement strategy of PMTs has also been studied in this work.

在这项工作中，我们提出了使用深度学习的事例重建，特别是在顶点与能量重建。我们将使用的方法在大亚湾中微子探测器中。利用所得结果，我们将深度学习应用到探测器设计中。我们发现大亚湾探测器的顶点和能量分辨率与光电倍增管（PMT）的个数是个 e 指数关系。在此工作，我们也对光电倍增管的布局策略做出了分析。

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