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Artificial Intelligence at the High Energy Frontier

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Whether searching for dark matter or measuring Standard Model parameters, analyzing data from the Large Hadron Collider is no easy task. Leveraging machine learning in high energy physics (HEP) is not a new idea, but recent AI advancements have accelerated analysis efforts. Methods like transformer models, variational auto-encoders, and graph neural networks have strengthened HEP analysis workflows. Further, domain-specific approaches, like Lorentz-invariant networks and embedded inductive biases, have tailored these approaches to this field. These techniques and other powerful machine learning analysis methods are currently being successfully deployed in a range of contexts, including at the high energy frontier.

Author: LAZAROVITS, Margaret Rose (The University of Kansas (US))

Presenter: LAZAROVITS, Margaret Rose (The University of Kansas (US))

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