

## **The road to AI-based discovery in particle physics**

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Modern machine learning and artificial intelligence are starting to fundamentally change how we analyze huge volumes of data in particle physics and adjacent scientific disciplines. These breakthroughs promise new insights into major scientific questions such as the nature of dark matter or the existence of physical phenomena beyond the standard model. This colloquium will provide an overview of recent, exciting developments with a focus on model agnostic discovery strategies — including first experimental results, fast simulations, and foundation models that simultaneously solve multiple tasks across multiple datasets.