

Accelerating the search for mass bumps using the Data-Directed Paradigm

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The Data-Directed paradigm (DDP) is a search strategy for efficiently probing new physics in a large number of spectra with smoothly-falling SM backgrounds. Unlike the traditional analysis strategy, DDP avoids the need for a simulated or functional-form based background estimate by directly predicting the statistical significance using a convolutional neural network trained to regress the log-likelihood-based significance. In this way, a trained network is used to identify mass bumps directly on data. By saving a considerable amount of time, this approach has the potential to expand the discovery reach by checking many unexplored regions. The method has shown good performance when finding various beyond standard model particles in simulation data. A description of the method and recent developments will be presented.

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