Contribution ID: **38** Type: **Flashtalk with Poster**

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

Tuesday, 30 April 2024 14:31 (3 minutes)

The Data-Directed paradigm (DDP) represents an innovative approach to efficiently investigate new physics across diverse spectra, which are in the presence of smoothly falling Standard Model (SM) backgrounds. Diverging from the conventional analysis employed in collider particle physics, DDP eliminates the necessity for a simulated or functionally derived background estimate. Instead, it directly forecasts statistical significance by utilizing a convolutional neural network trained to regress log-likelihood-based significance. This novel methodology enables the identification of mass bumps directly from the data, circumventing the need for background estimation and saving significant analysis time.
By employing a trained network to detect mass bumps in the data, the DDP approach holds the potential to significantly enhance the discovery reach by exploring numerous uncharted regions. The efficiency of this method has been demonstrated through its successful identification of various beyond standard model particles in simulation data. A detailed presentation of the methodology and recent advancements will be provided.

Primary authors: EL MOUSSAOUY, Ali; SHKURI, Amit (Weizmann Institute of Science); PASCUAL DIAS, Bruna (Université de Montréal); DREYER, Etienne (Weizmann Institute of Science); MAYER, Eva (Université Clermont Auvergne); BILODEAU, Fannie (Université de Montréal); AZUELOS, Georges; ARGUIN, Jean-François (Université de Montréal); NOCE DONINI, Julien (Université Clermont Auvergne); USMAN, Muhammad (Université de Montréal); KAKATI, Nilotpal (Weizmann Institute of Science); CALVET, Samuel (Université Clermont Auvergne); BRESSLER, Shikma (Weizmann Institute of Science); BARIL, Émile (Université de Montréal)

Presenter: BILODEAU, Fannie (Université de Montréal)

Session Classification: 1.1 Pattern recognition & Image analysis

Track Classification: Session A