Contribution ID: **188** Type: **Talk**

Extraction of S-matrix pole structure using deep learning

Wednesday 8 September 2021 17:20 (20 minutes)

We developed a deep neural network (DNN) to determine the pole configuration of a coupled-channel scattering with near-threshold enhancement. The trained DNN takes the partial wave amplitude as input and gives the number of nearby poles in any of the unphysical sheets. To avoid any possible model bias, we generate a training dataset using an S-matrix where the relevant pole parameters are independent of any coupling strength. The inclusion of limited energy resolution to the training dataset requires curriculum-type training. We apply our method to probe the pole structure of the πN elastic amplitude and find that the enhancements seen between the ηN and $K\Sigma$ thresholds are due to one pole in each adjacent Riemann sheet and at most two poles in the distant sheet. The output of our method can be used as a guide in designing an appropriate parametrization to extract and pinpoint the pole positions.

Primary author: Dr SOMBILLO, Denny Lane (RCNP, Osaka University and NIP University of the Philippines Diliman)

Presenter: Dr SOMBILLO, Denny Lane (RCNP, Osaka University and NIP University of the Philippines Diliman)

Session Classification: Hadron spectroscopy and exotics

Track Classification: Hadron spectroscopy and exotics