Figure 6: An example input to a Convolutional Neural Network (CNN) for the Phase-2 ATLAS Level-0 muon trigger, implemented on a FPGA, is shown. This example contains three muons without background. Resistive Plate Chambers (RPC) hits of a fixed φ sector are arranged in a matrix-like object. Each bin of the y-axis corresponds to a detector layer (3 detector layers for inner station, 4 for the middle and 2 for the outer station). The x-axis maps the η coordinates of each physics RPC strip: for the i-th strip \( \eta_{bin}^i = 384 \frac{\eta^i - \eta_{min}}{\eta_{max} - \eta_{min}} \), where \( \eta_{max} \) and \( \eta_{min} \) are respectively the maximum (\( \eta_{max} = 0.95 \)) and the minimum (\( \eta_{min} = 0.07 \)) η values for the barrel RPC strips chosen to prevent muons to fall outside any layer of a specified sector; 384 is a realistic number of strips per layer. This particular choice has been taken in order to evaluate ML algorithm performances, without any geometrical acceptance effect. Random background has been added. The background rate has been evaluated from minimum bias events. Events used in the training phase of the CNN can also contain two or more muons in the same sector. Events with more than one muon are built superimposing one muon images with no background, which is then included. The CNN output is set to evaluate transverse momentum and η of the leading and sub-leading muons (if the latter exists) in the sector and returns also a flag for events that contain more than 2 muons.