

 $\begin{aligned} x_i &= [type, \, p_T, \, E_{hcal}, \, E_{ecal}, \, \eta, \, \varphi, \, \eta_{outer}, \, \varphi_{outer}, \, track \, charge, \, ...], \, type \in \{track, \, calo. \, cluster\} \\ y_i &= [PID, \, p_T, \, E, \, \eta, \, \varphi, \, particle \, charge, \, ...], \, PID \in \{none, \, ch.had., \, n.had., \, \gamma, \, e^\pm, \, \mu^\pm\} \\ h_i &\in \mathbb{R}^N, \, N = 256 \end{aligned}$

trainable neural networks: f, g, d