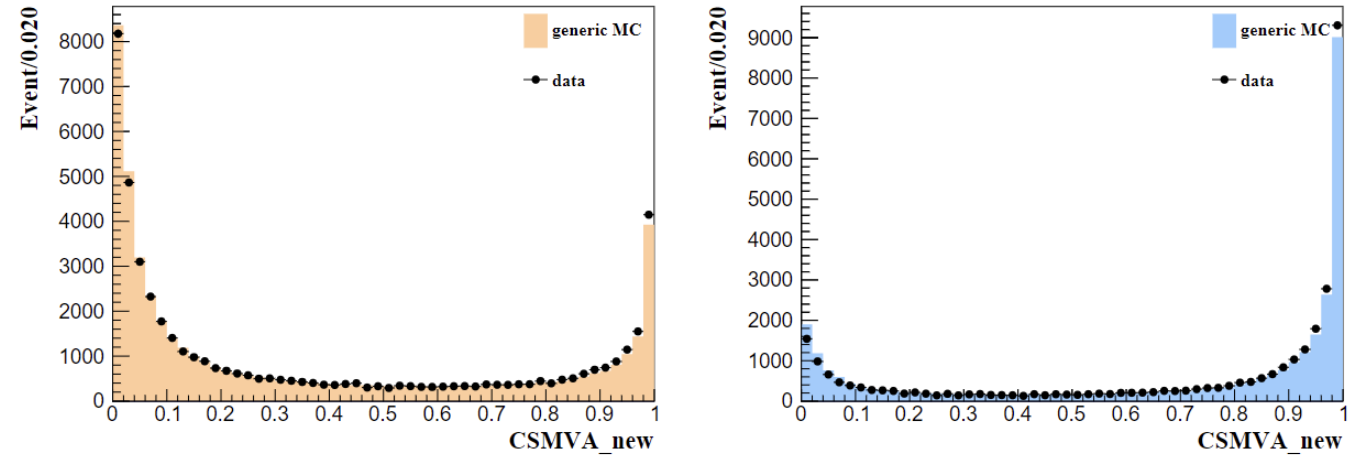


# Group Meeting

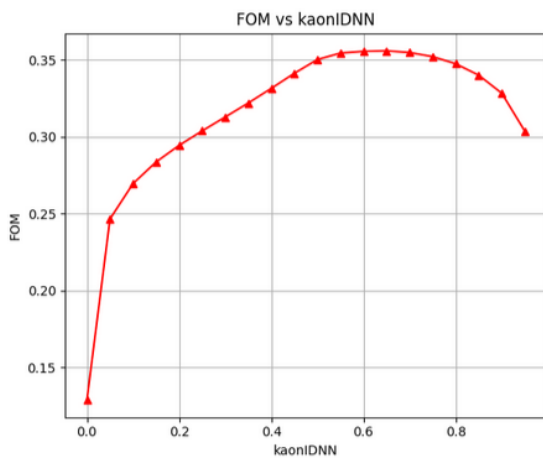
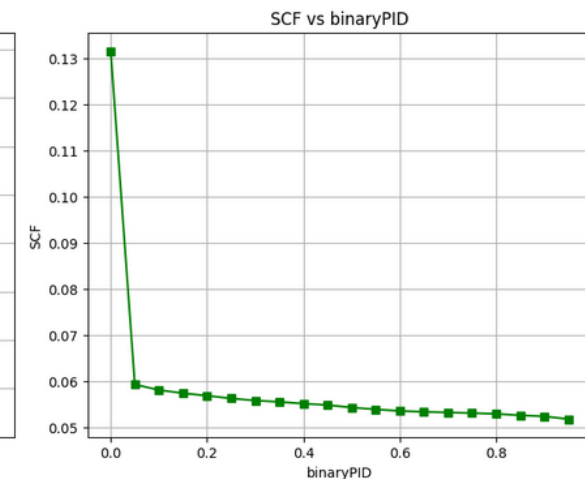
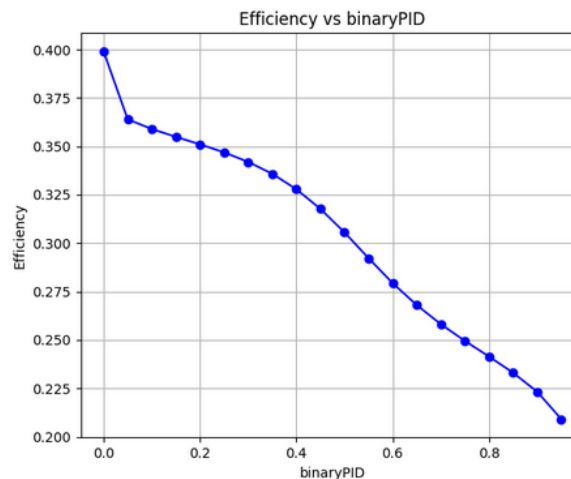
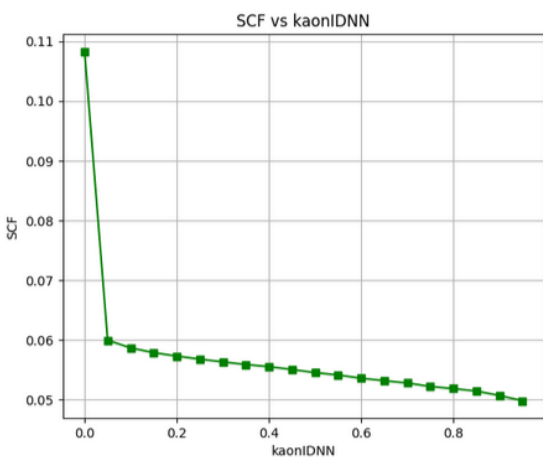
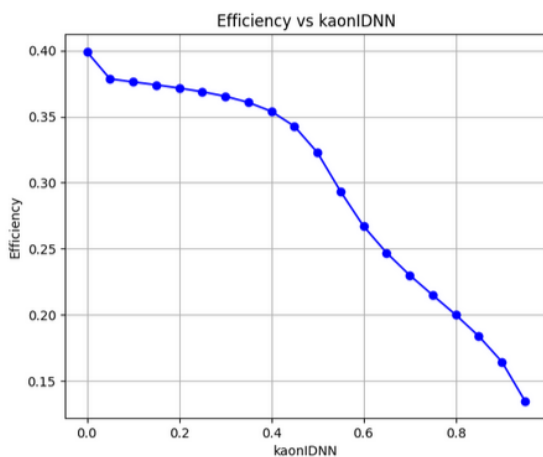
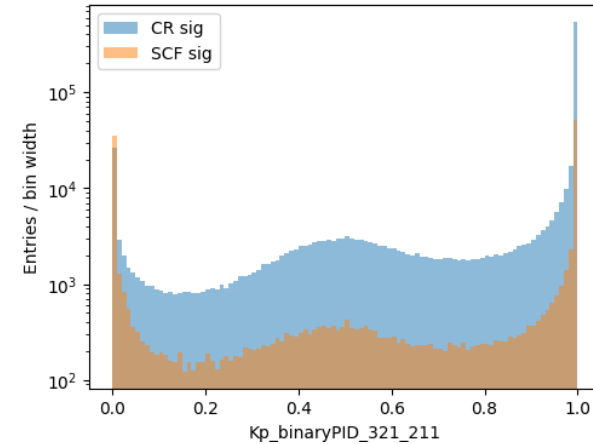
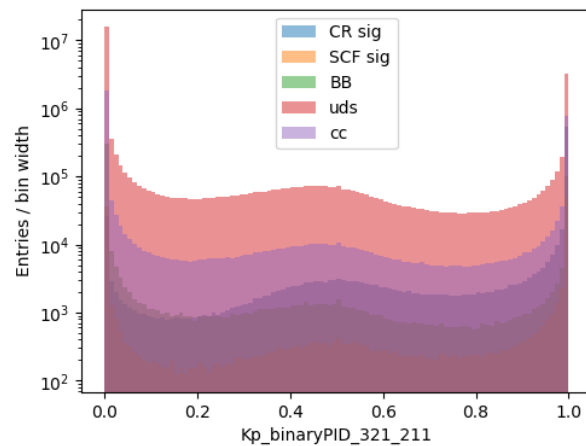
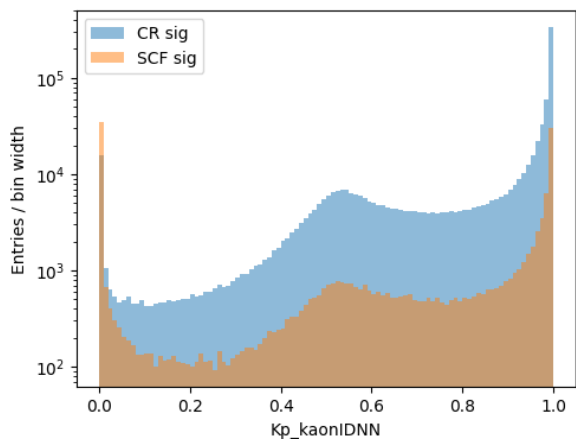
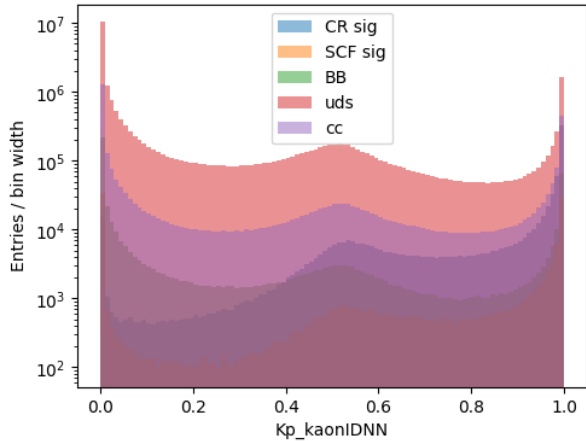
2024.11.8

- ✓ MC15ri → MC15rd
- ✓ binaryPID → kaonIDNN
- ✓ Flavor tag output → qrGNN
- ? Mbc → Mbc\_mod
- ? BtoKpipi

□ Control channel MC running ...

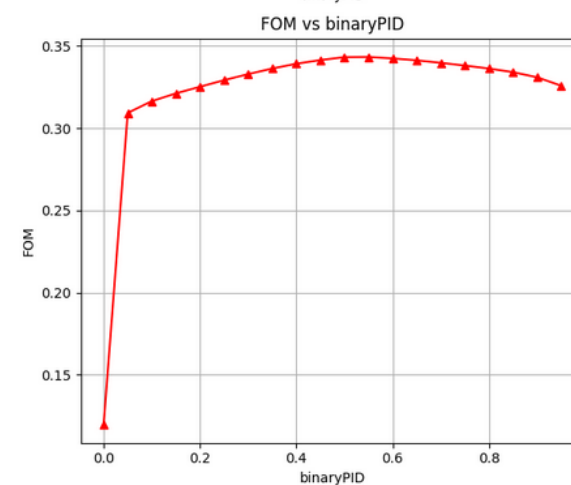


Data-simulation comparison of the FBDT output on (left) background-enhanced and (right) signal-enhanced  $B^+ \rightarrow \bar{D}^0 (\rightarrow K^+ \pi^- \pi^0) \pi^+$  candidates. MC is normalized to the total number of data events for better comparison



**[0.55]**  
 FOM : [0.35446386]  
 eff : [0.29346985]  
 scf : [0.05412318]

**opt result:**  
 0.65  
 FOM : 0.35592215815571016  
 eff : 0.24695373332459525  
 scf : 0.05317101675107129

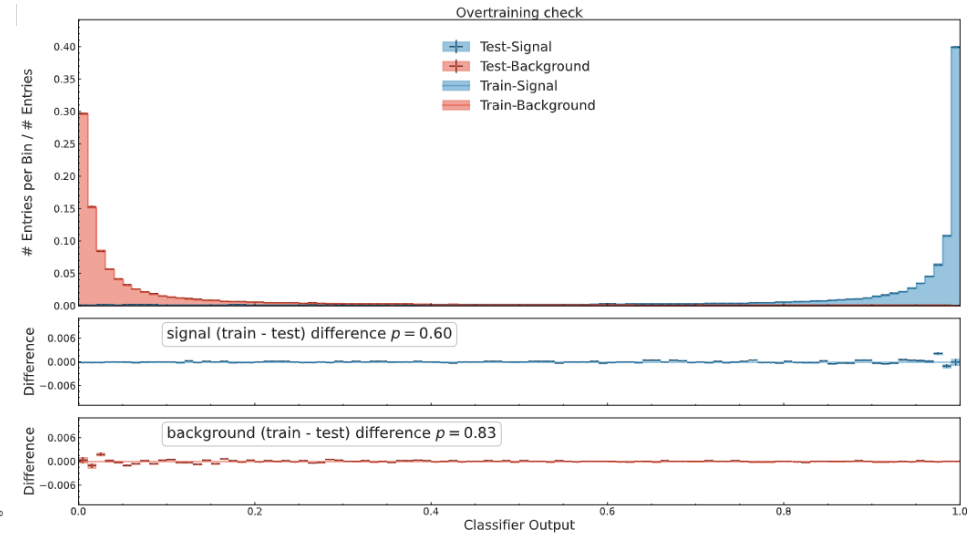
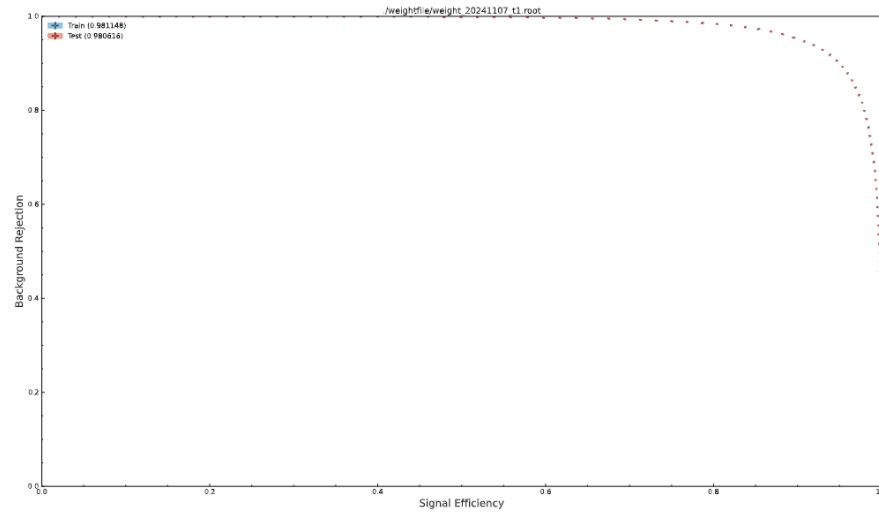
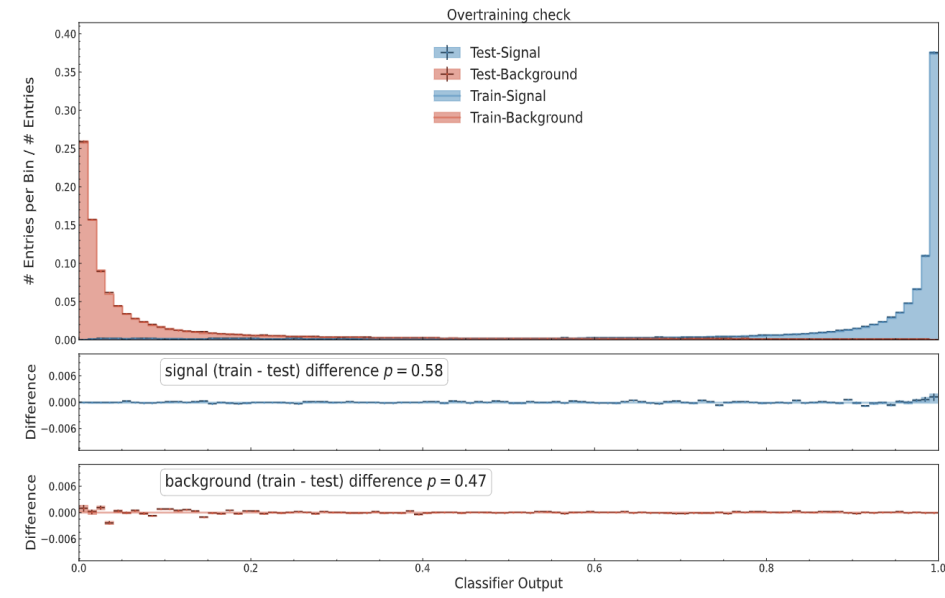
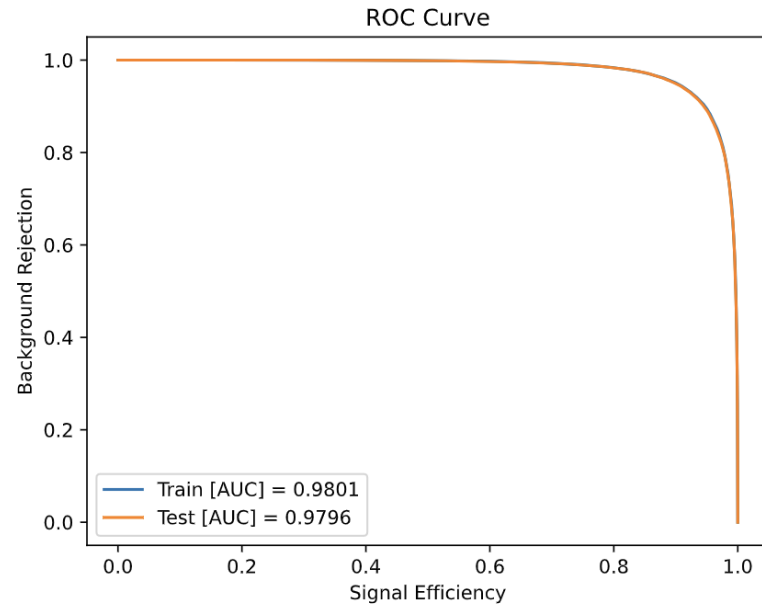


**opt result:**  
 0.55  
 FOM : 0.34327659109073927  
 eff : 0.2922404215011941  
 scf : 0.053943464617692144

**[0.65]**  
 FOM : [0.34121801]  
 eff : [0.26803032]  
 scf : [0.05340922]

- Add qrGNN

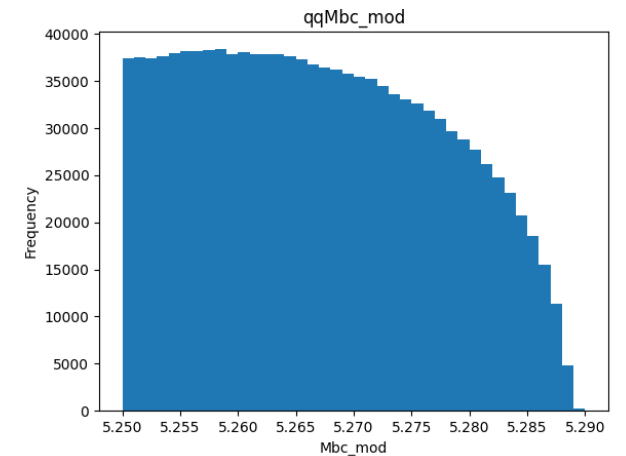
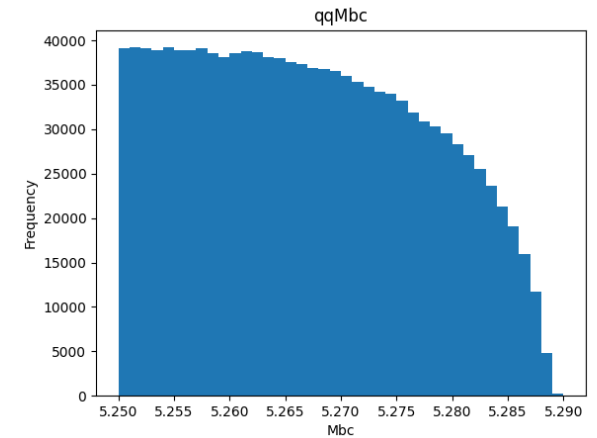
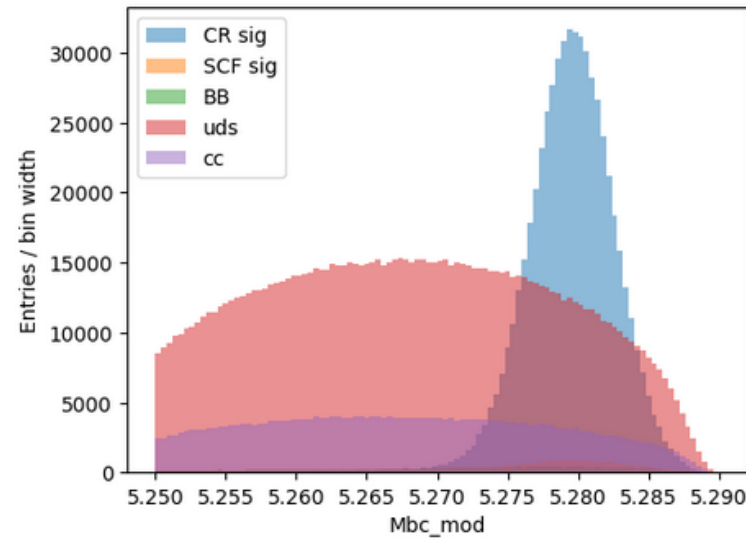
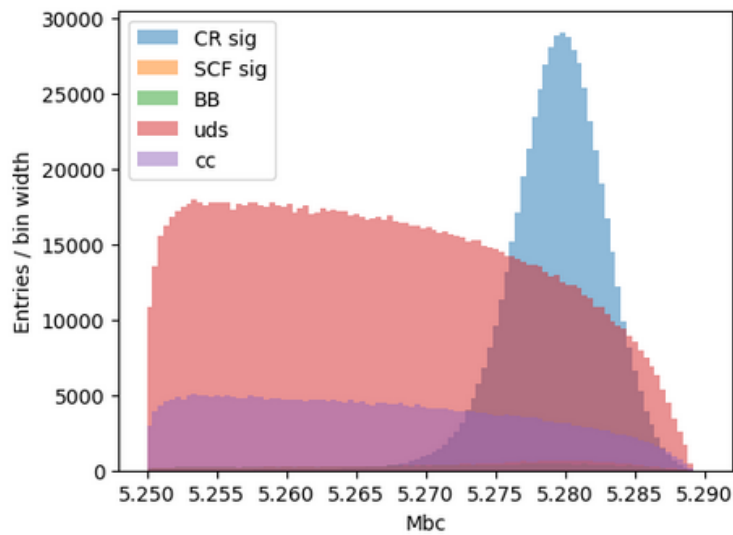
- AUC (train)  
0.9801 → 0.9811
- AUC (test)  
0.9796 → 0.9806



- Mbc\_mod

$$p_{\pi^0}^{*'} = \sqrt{(E_{beam}^* - E_{K^+}^* - E_{K^-}^*)^2 - m_{\pi^0}^2 c^2} \times \frac{p_{\pi^0}^*}{|p_{\pi^0}^*|}$$

order to improve the resolution and reduce the correlation with  $\Delta E$ , we redefine the beam-constrained mass as  $M'_{bc}$ , by replacing the measured  $\pi^0$  momentum with  $p_{\pi^0}^{*'} = \sqrt{(E_{beam}^* - E_{J/\psi}^*)^2/c^2 - m_{\pi^0}^2 c^2} \times \frac{p_{\pi^0}^*}{|p_{\pi^0}^*|}$ , where  $E_{J/\psi}^*$  is the energy of the  $J/\psi$  candidate in the c.m. frame. We only keep candidates with  $M'_{bc} > 5.27 \text{ GeV}/c^2$ ,  $\Delta E \in [-0.18, 0.3] \text{ GeV}$ ,  $m(\ell^+\ell^-) \in [2.95, 3.2] \text{ GeV}/c^2$  and  $m(\gamma\gamma) \in [0.1, 0.16] \text{ GeV}/c^2$ .



```
[16]: print(len(uds1.query("Mbc > 5.27")))
      print(len(uds1.query("Mbc_mod > 5.27")))
```

548542  
528722