How correlated at the BDT scores?
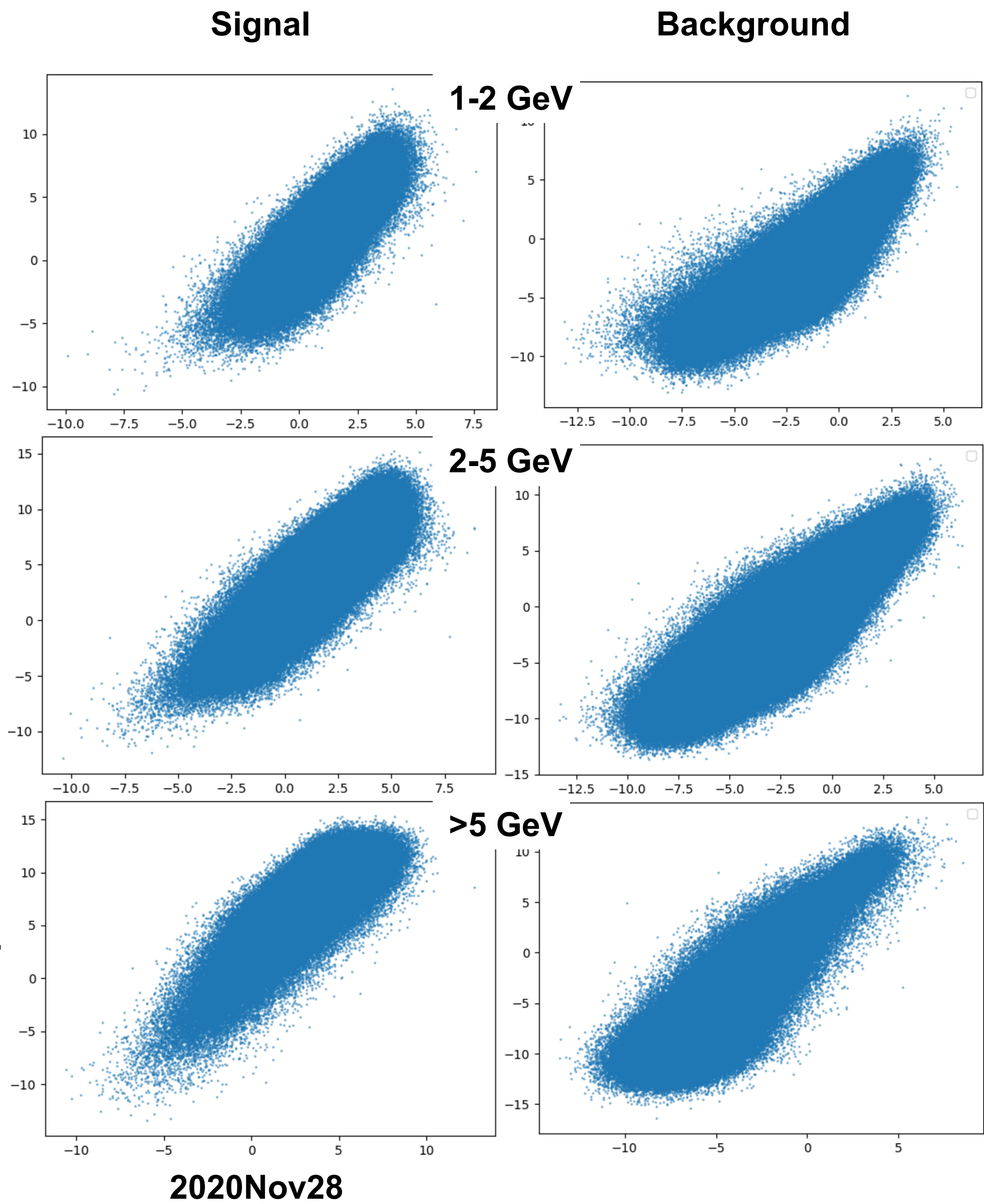
The 2020Sept15 model, tuned using 10_2_X samples as part of the BParking studies, is now used in the 10_6_X release as part of the UL re-miniAOD campaign to select low-pT PAT electrons.

The 2020Nov15 model is "final" model, trained using 10_6_X UL samples, currently being integrated within 11_3_X via this PR.

The scatter plots on the left show how the two scores are correlated for three pT bins. Any non-linear structure, mainly visible for the background, is likely due to the use of an OR of the thresholds on the two BDT scores at the ElectronSeed step, most relevant at low pT.

The ROC curves on the right show the performance for the two BDT models, before (top) and after (bottom) a cut on the 2020Sept15 model score of 1.5.

We find this behaviour acceptable.

Signal   **Background**

1-2 GeV

2-5 GeV

>5 GeV

2020Sept15

2020Nov28

Trainings comparison

Depth10 (AUC: 0.958)
B-Parking Id (AUC: 0.948)

2020Sept15
2020Nov28

No threshold requirement on 2020Sept15 model in lowPtElectronSelector_cfi

Trainings comparison

Depth10 (AUC: 0.849)
B-Parking Id (AUC: 0.823)

2020Sept15
2020Nov28

Threshold requirement of **score > 1.5** for 2020Sept15 model in lowPtElectronSelector_cfi