# CEPC

Jets, samples and Wednesday working meeting

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Current JOI

CEPC TDR Jet Origin ID
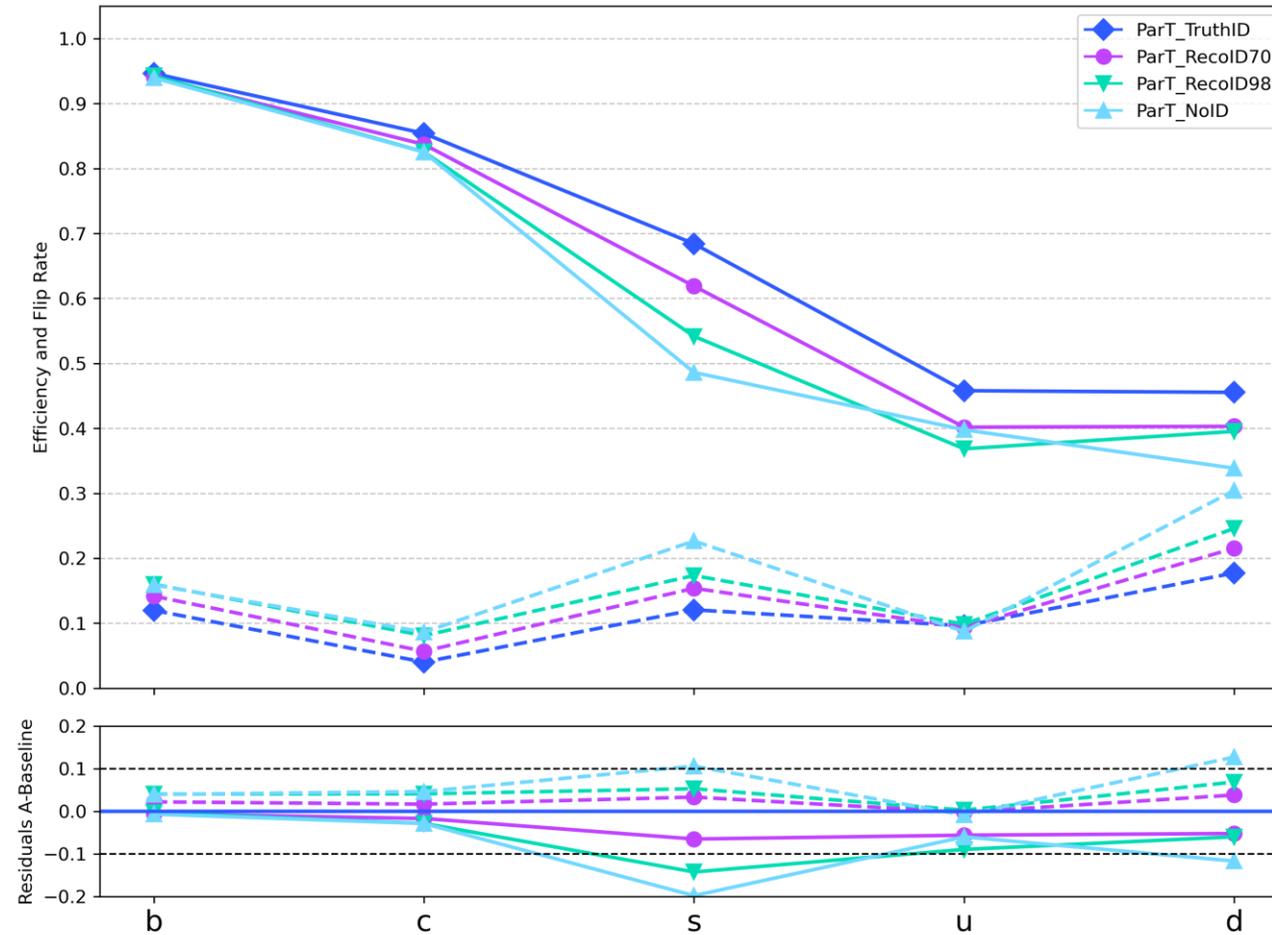
Tagging Eff & Charge Flip rate

| TruthID	Efficiency	Flip Rate	Reco70	Efficiency	Flip Rate	Reco98	Efficiency	Flip Rate	NoID	Efficiency	Flip Rate
b	0.95	0.12	b	0.94	0.14	b	0.94	0.16	b	0.94	0.16
c	0.85	0.04	c	0.84	0.06	c	0.83	0.08	c	0.83	0.09
s	0.68	0.12	s	0.62	0.15	s	0.54	0.17	s	0.49	0.23
u	0.46	0.10	u	0.40	0.09	u	0.37	0.10	u	0.40	0.09
d	0.46	0.18	d	0.40	0.22	d	0.40	0.25	d	0.34	0.30
g	0.44		g	0.46		g	0.41		g	0.47	
Metric	0.5936			0.5510			0.5153			0.5030	

Overtraining:

TensorBoard convergence analysis confirms stable training convergence across all models.
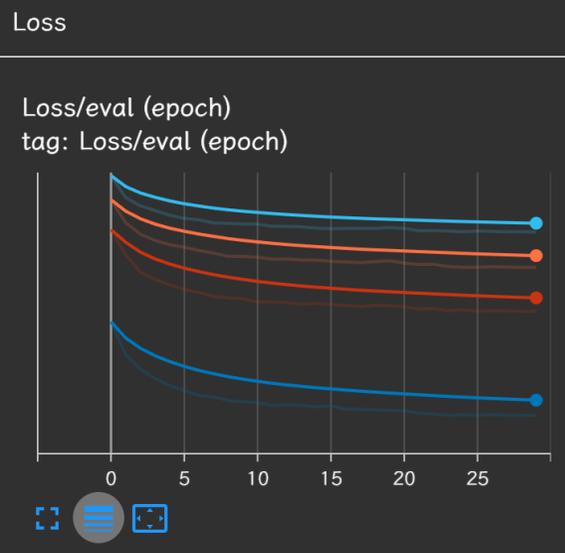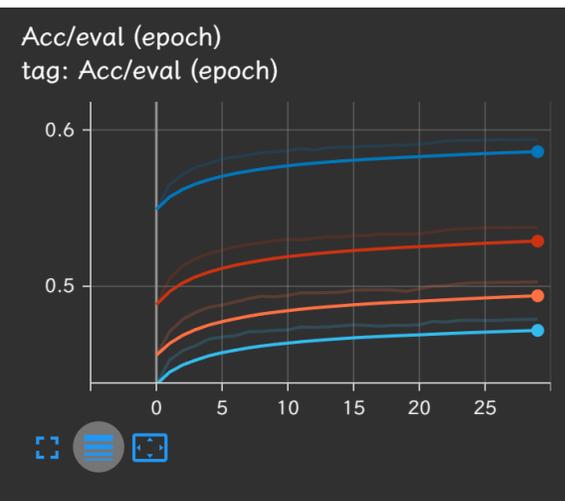
Name	Smoothed	Value	Step	Time	Relative
Apr15_06-24-56_gpu013.ihep.ac.cnJet_ParT0415NoID_higgs_full_ParT	0.4945	0.5026	29	Tue Apr 15, 23:13:31	16h 14m 52s
Apr15_06-34-40_gpu026.ihep.ac.cnJet_ParT0415TruthID_higgs_full_ParT	0.585	0.5935	29	Tue Apr 15, 20:51:00	13h 47m 43s
Apr15_10-30-36_gpu017.ihep.ac.cnJet_ParT0415CNoID_higgs_full_ParT	0.4749	0.4812	29	Wed Apr 16, 02:47:44	15h 44m 40s
Apr15_10-30-36_gpu019.ihep.ac.cnJet_ParT0415RecoID98_higgs_full_ParT	0.5271	0.5356	29	Wed Apr 16, 05:58:03	18h 49m 5s
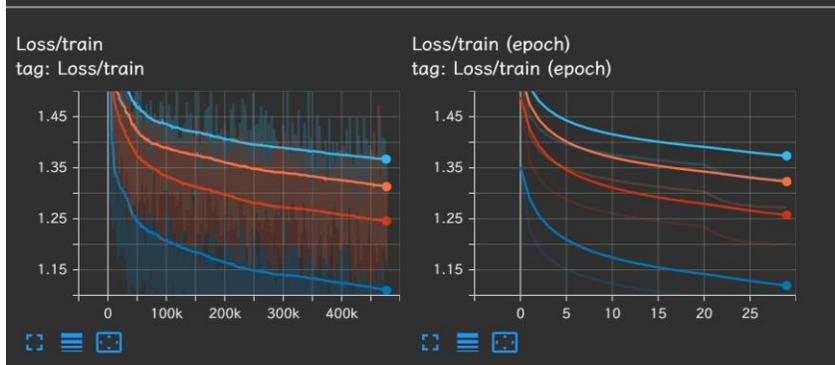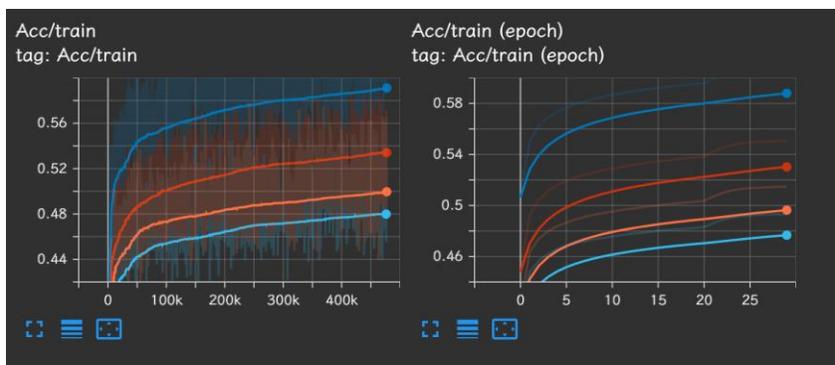
Confusion Matrix
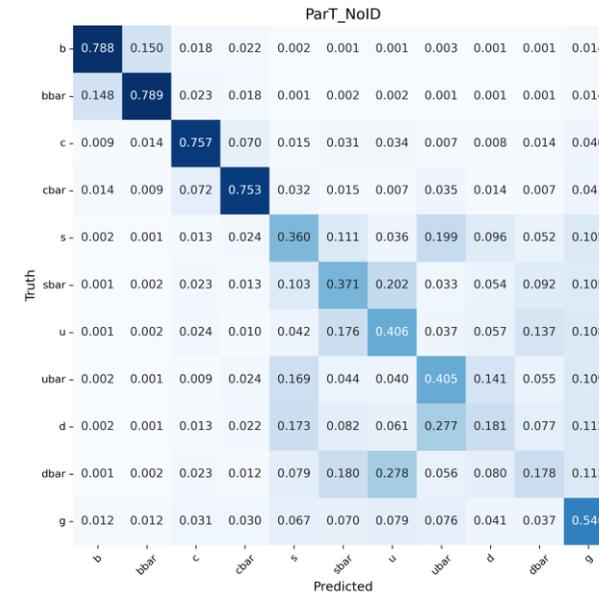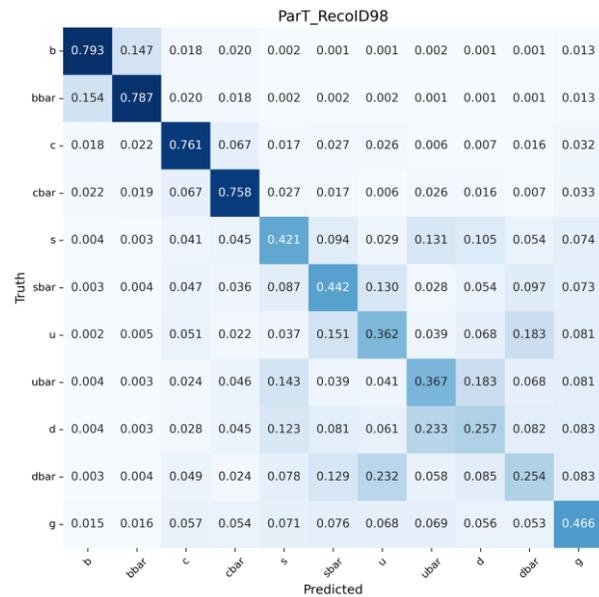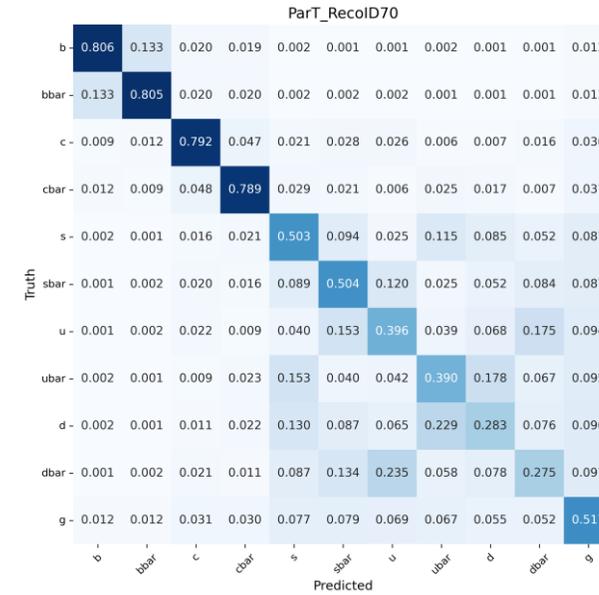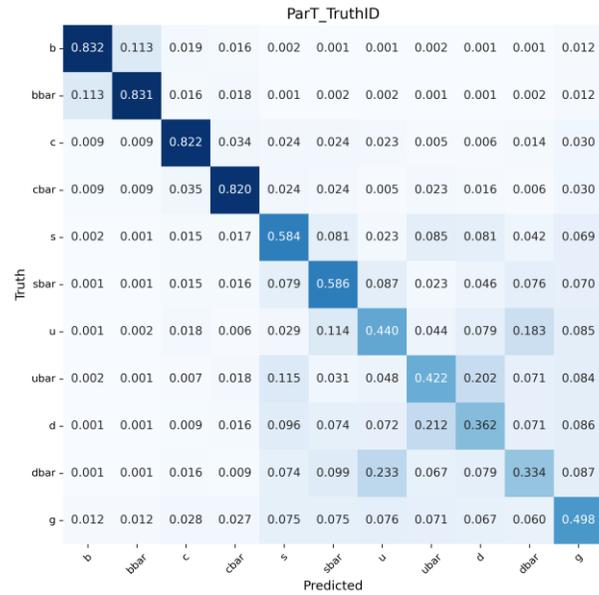
Matrix Difference

- Largest impact in S-Sbar tagging.
- Truth-label–wise normalization ensures row conservation

22% more truth s quarks are not tagged as s quark.
11% more truth s quarks are tagged as ubar quark.
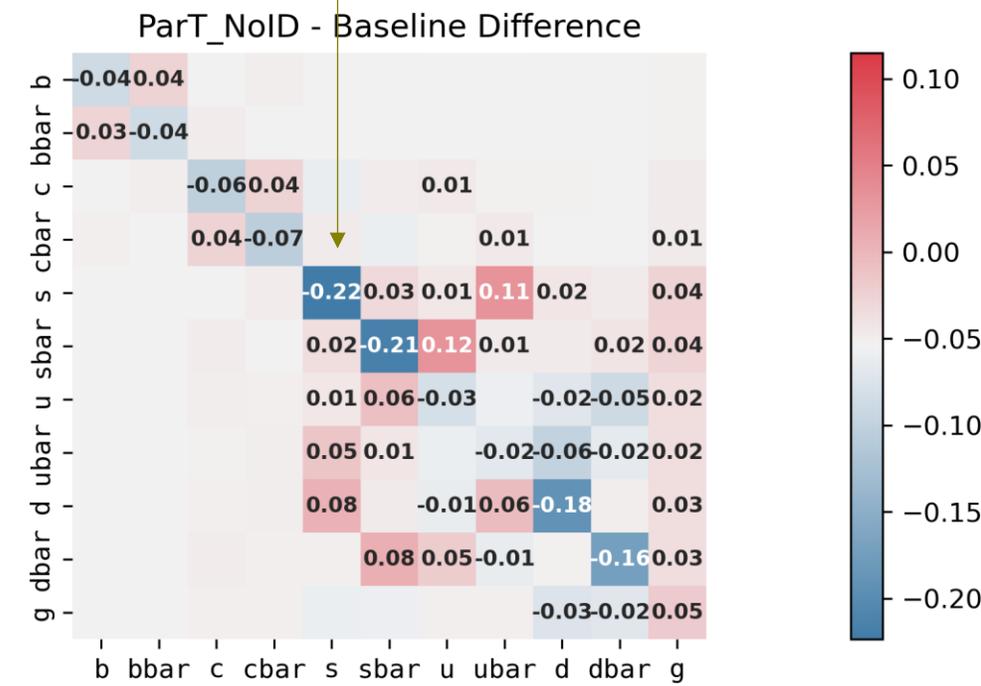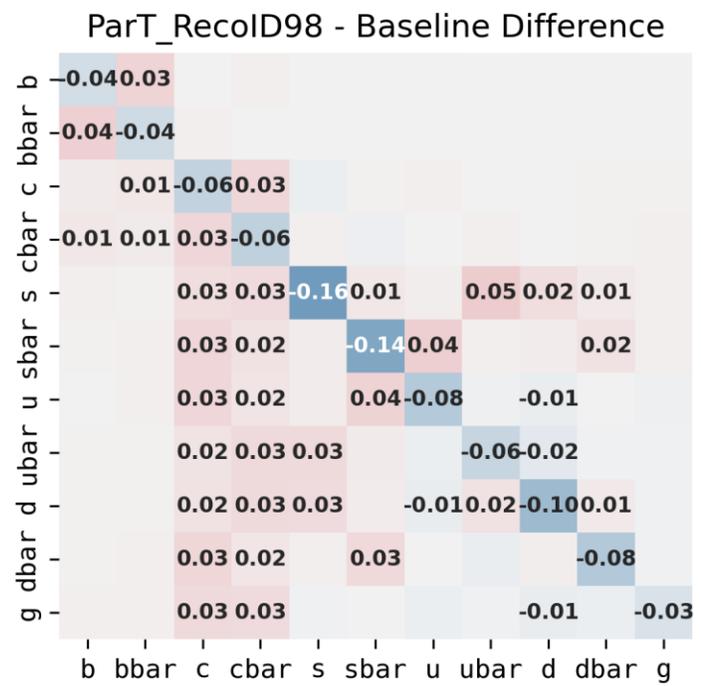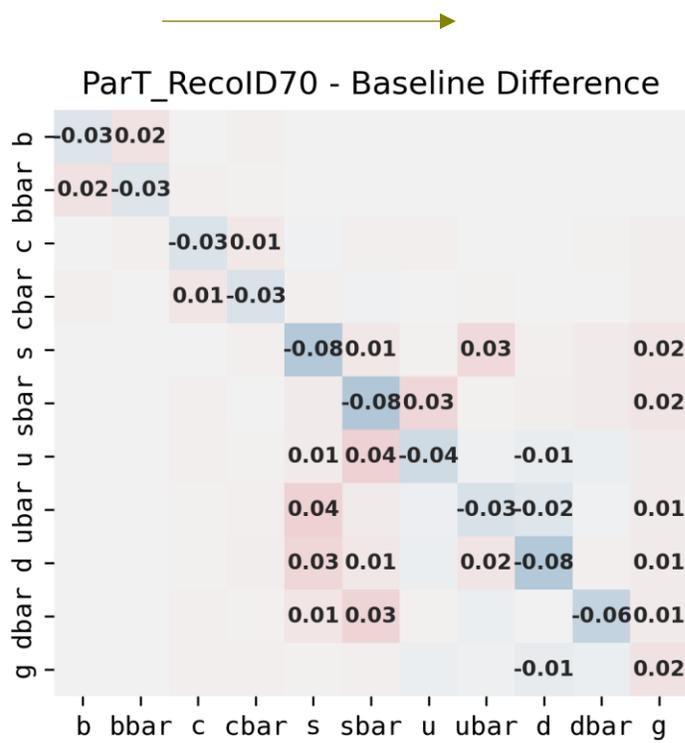
With/wo PID, b/c quark do not mix with udsg.
(but better separation b and bbar).

With RecoID98(higher lepton rate), uds are likely to be tagged as c quark;
While in NoID it disappeared. -> tagged as gluon.

JOI with charged only tracks

Charged Confusion Matrix
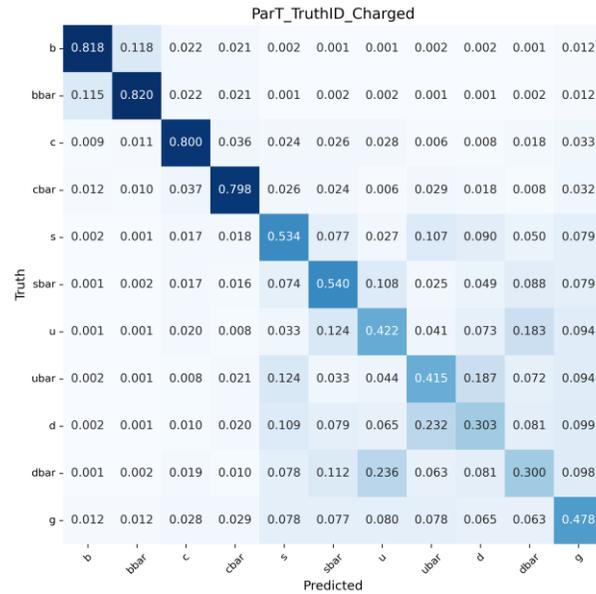
Truth: 0.5661
Reco70:   0.5281
Reco98:   0.5142
NoID: 0.4825
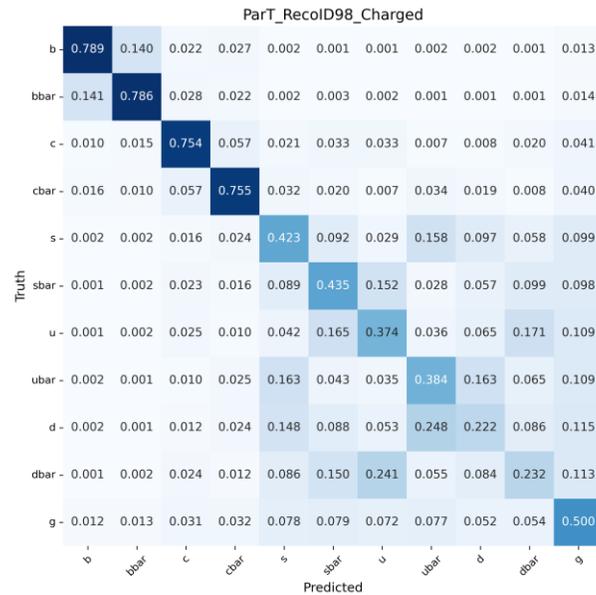
Charged Matrix Difference

Similar performance corresponds to FullPFOs.
Nertral PFO contributions are global and not for any specified flavor.
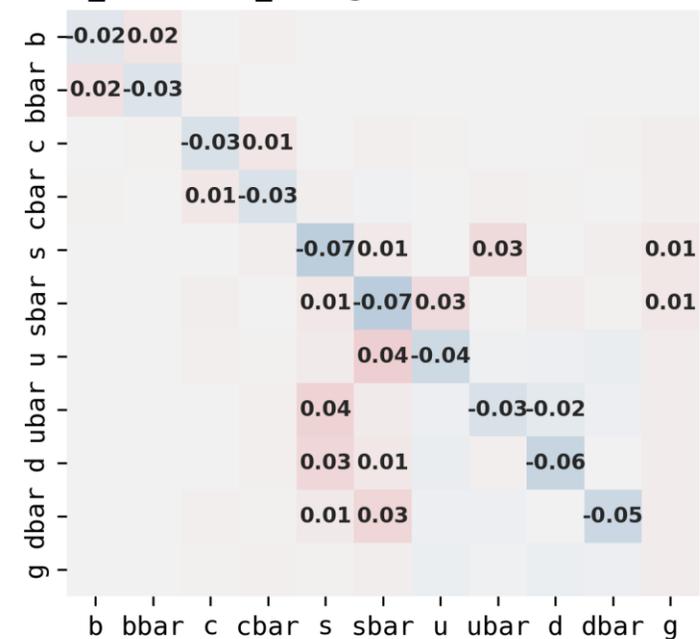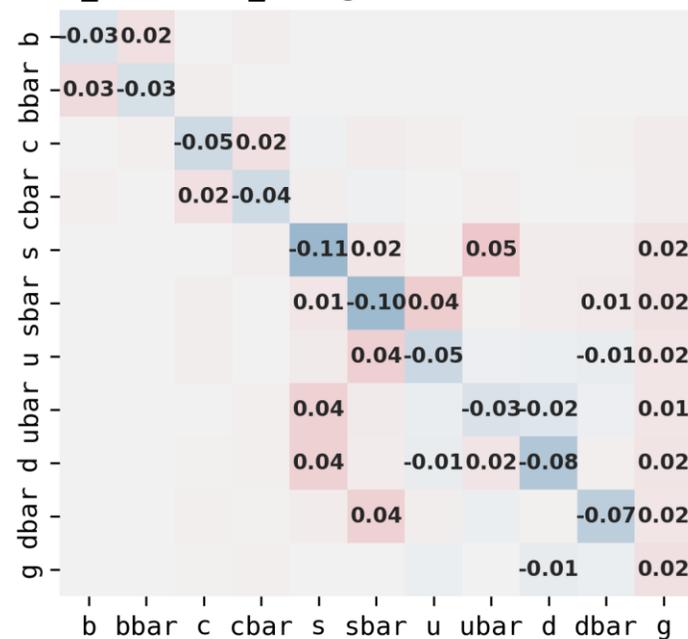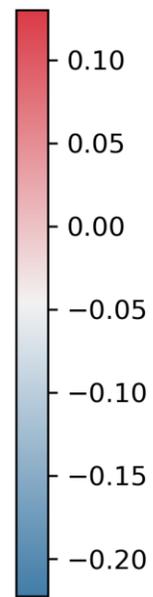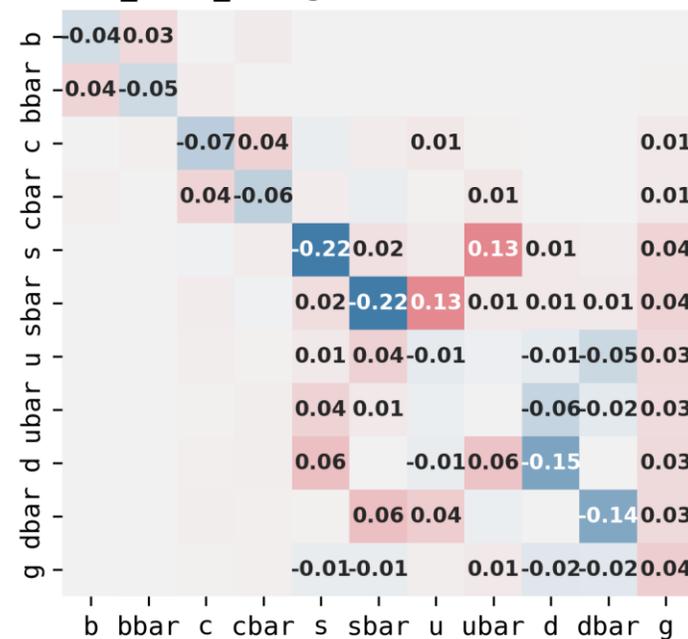
# Residual: only charged tracks

CEPC TDR Jet Origin ID
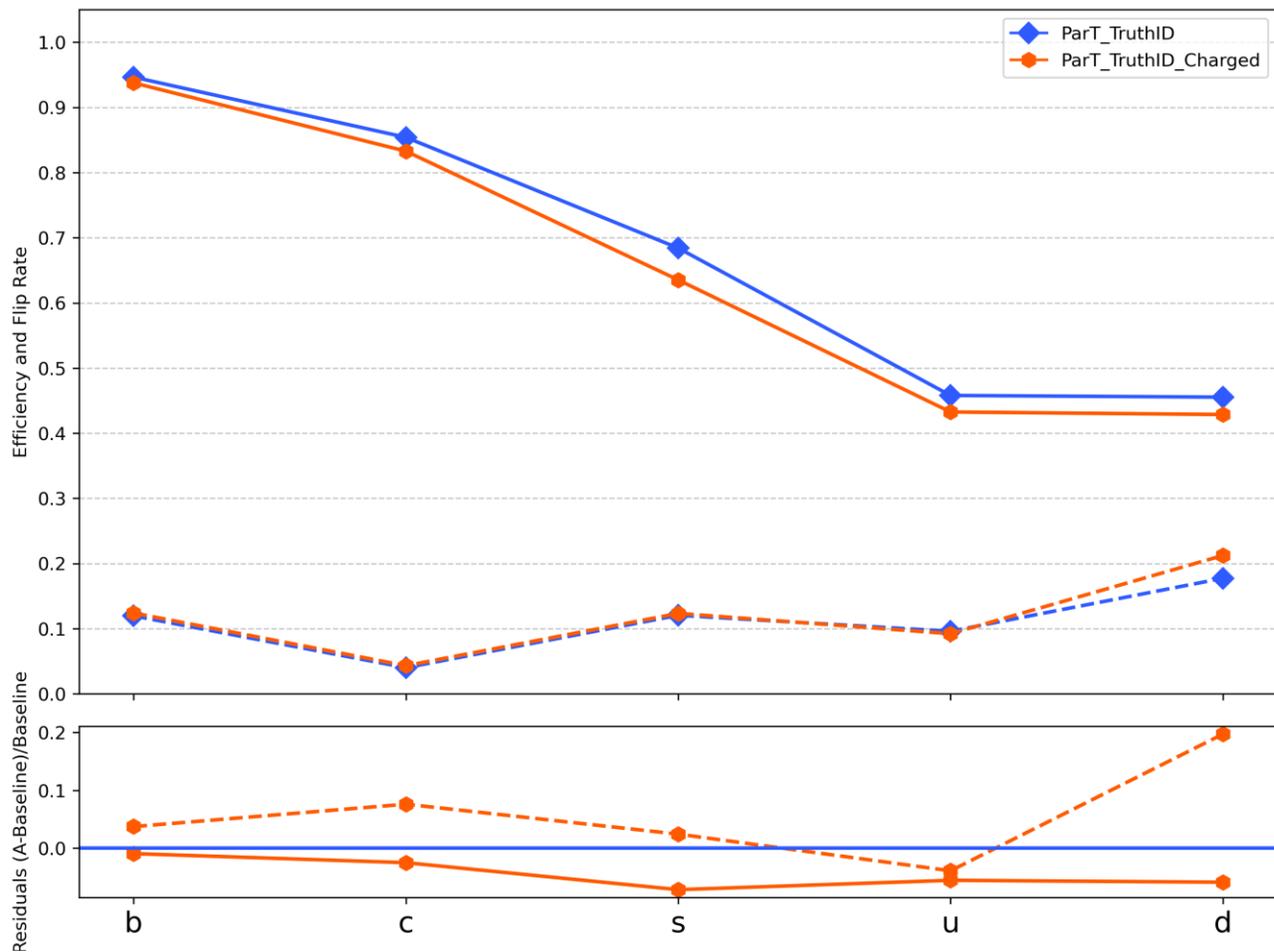
Baseline	Efficiency	Flip Rate	Charged	Efficiency	Flip Rate
b	0.95	0.12	**b**	0.94	0.12
c	0.85	0.04	**c**	0.83	0.04
s	0.68	0.12	**s**	0.64	0.12
u	0.46	0.10	**u**	0.43	0.09
d	0.46	0.18	**d**	0.43	0.21
g	0.44		**g**	0.42	
Metric	0.5936			0.5661	

Consistent Analysis: TDR ParT vs PN Truth ID

0.5936: 0.5579
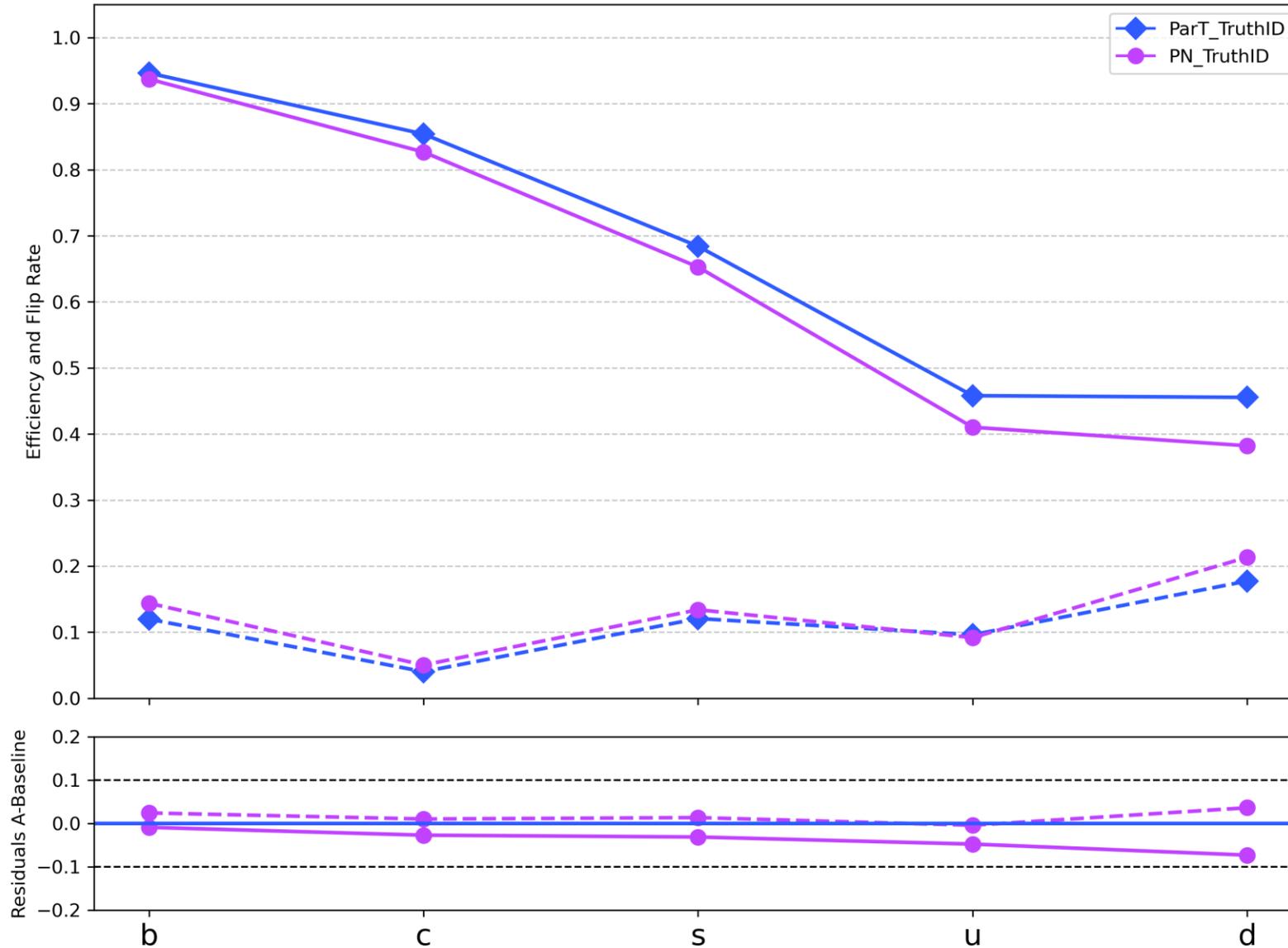
Matrix Difference

ParT with better metric, while PN has better gluon separation.
The improvement is believed from TLorentz vector information.

PN_TruthID - Baseline Difference
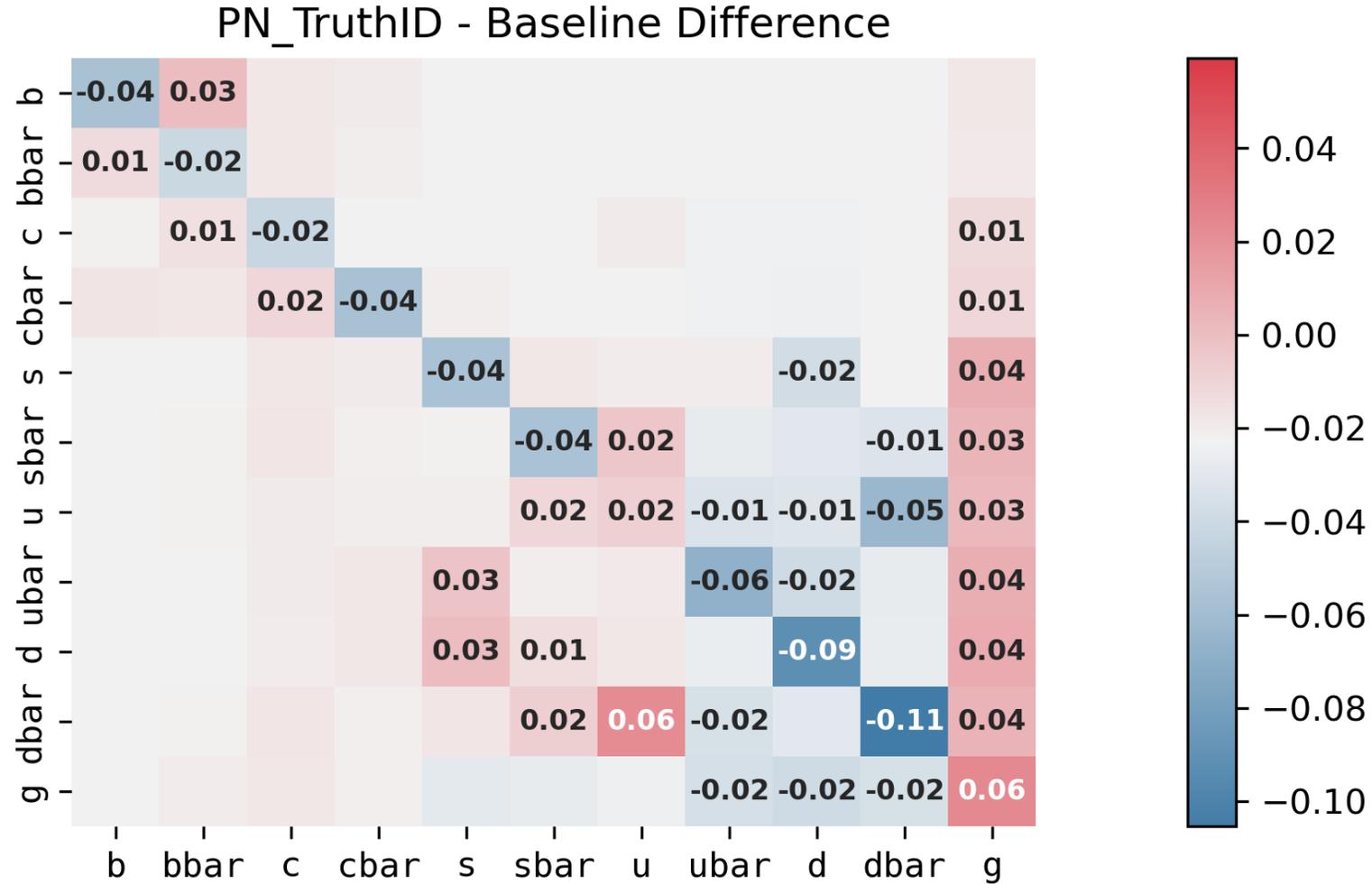
Consistent Analysis: ParT_Reco70

0.5510: 0.5319

CEPC TDR Jet Origin ID
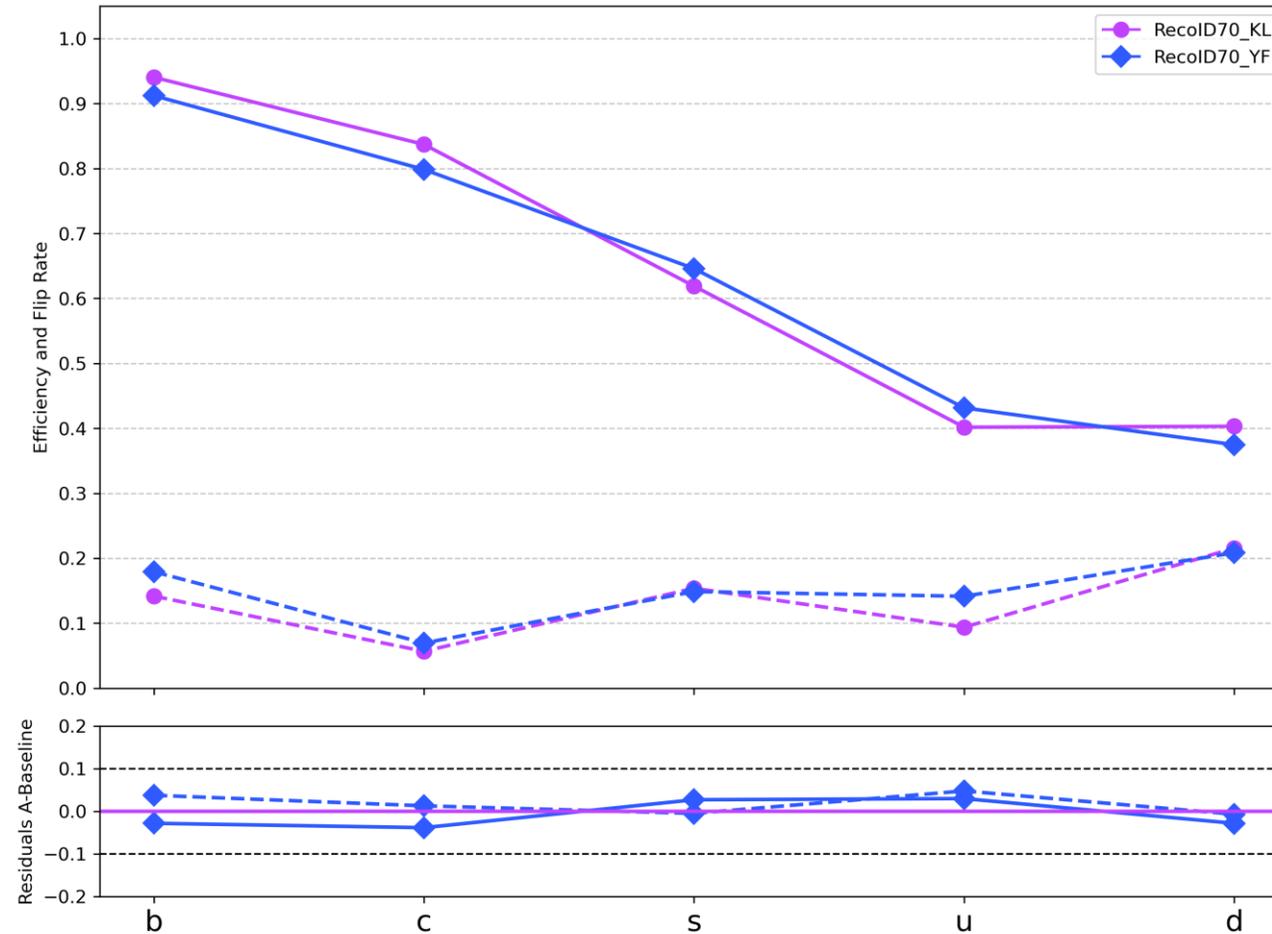
Matrix Difference

Under check for input variables and traing hyper parameter.

RecoID70_YF - Baseline Difference
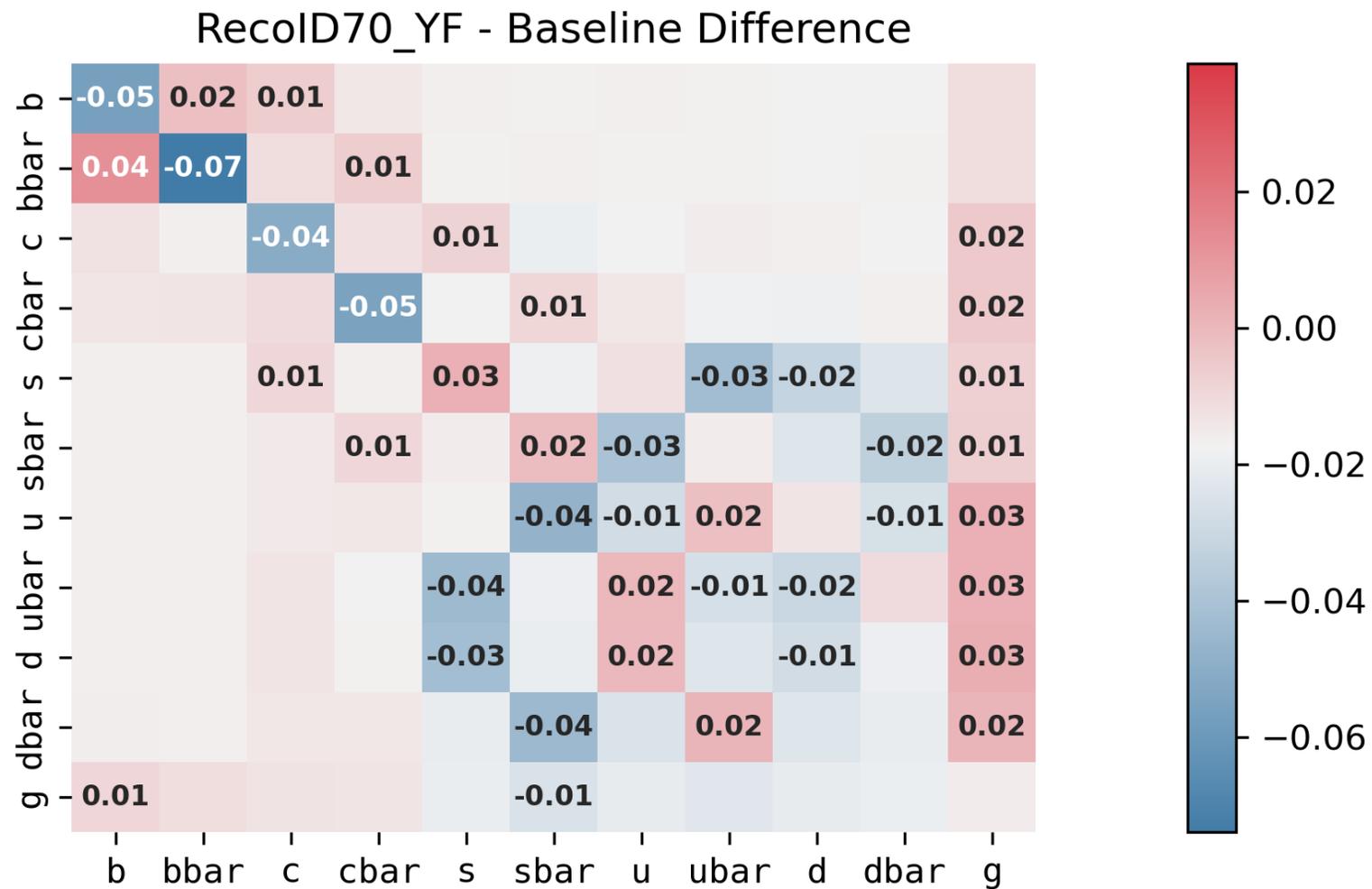
Consistent Analysis: PN_TruthID

0.5579: 0.5486

CEPC TDR Jet Origin ID
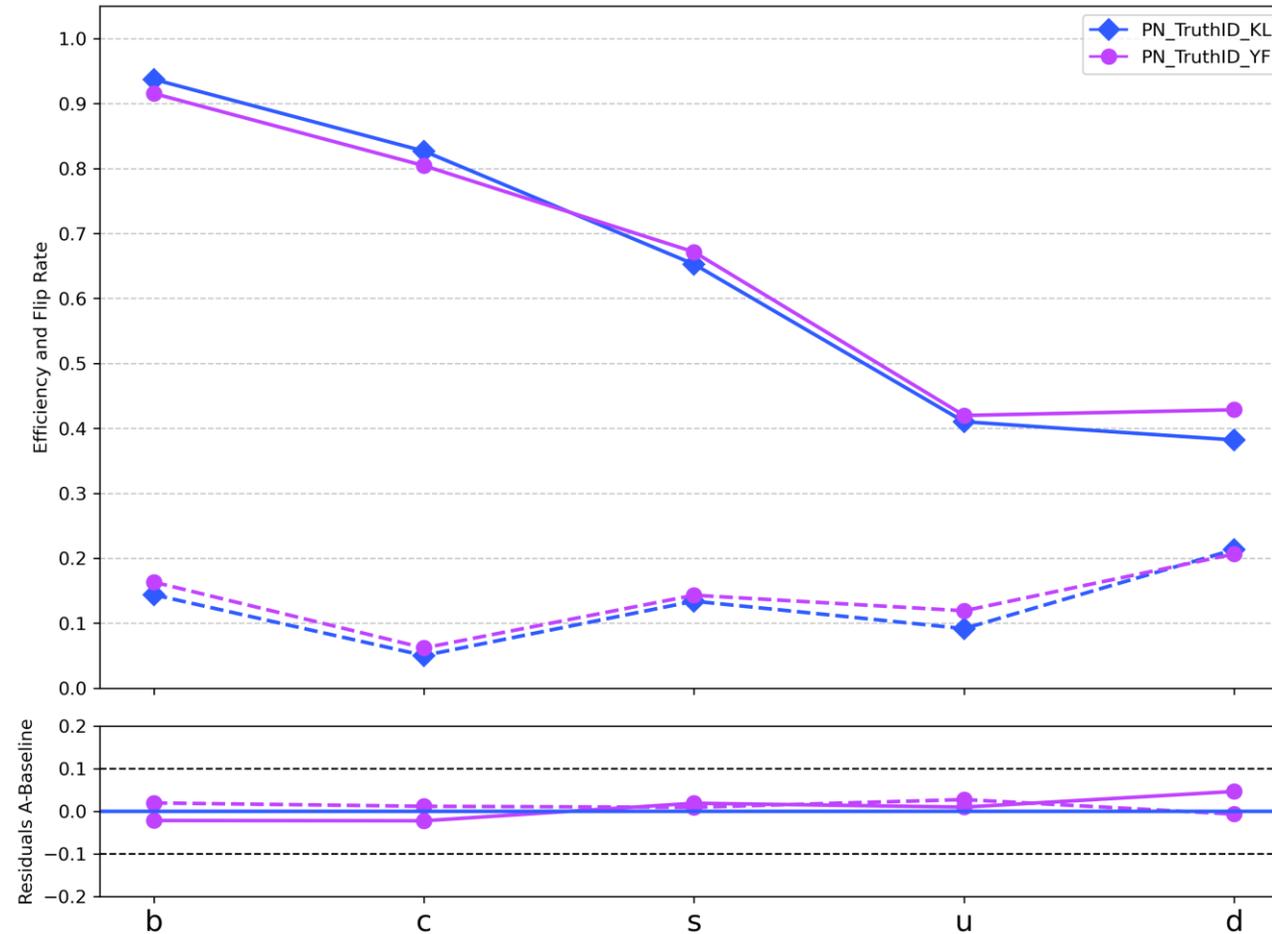
Matrix Difference

Similar performance while migration from u/dbar.

PN_TruthID_YF - Baseline Difference
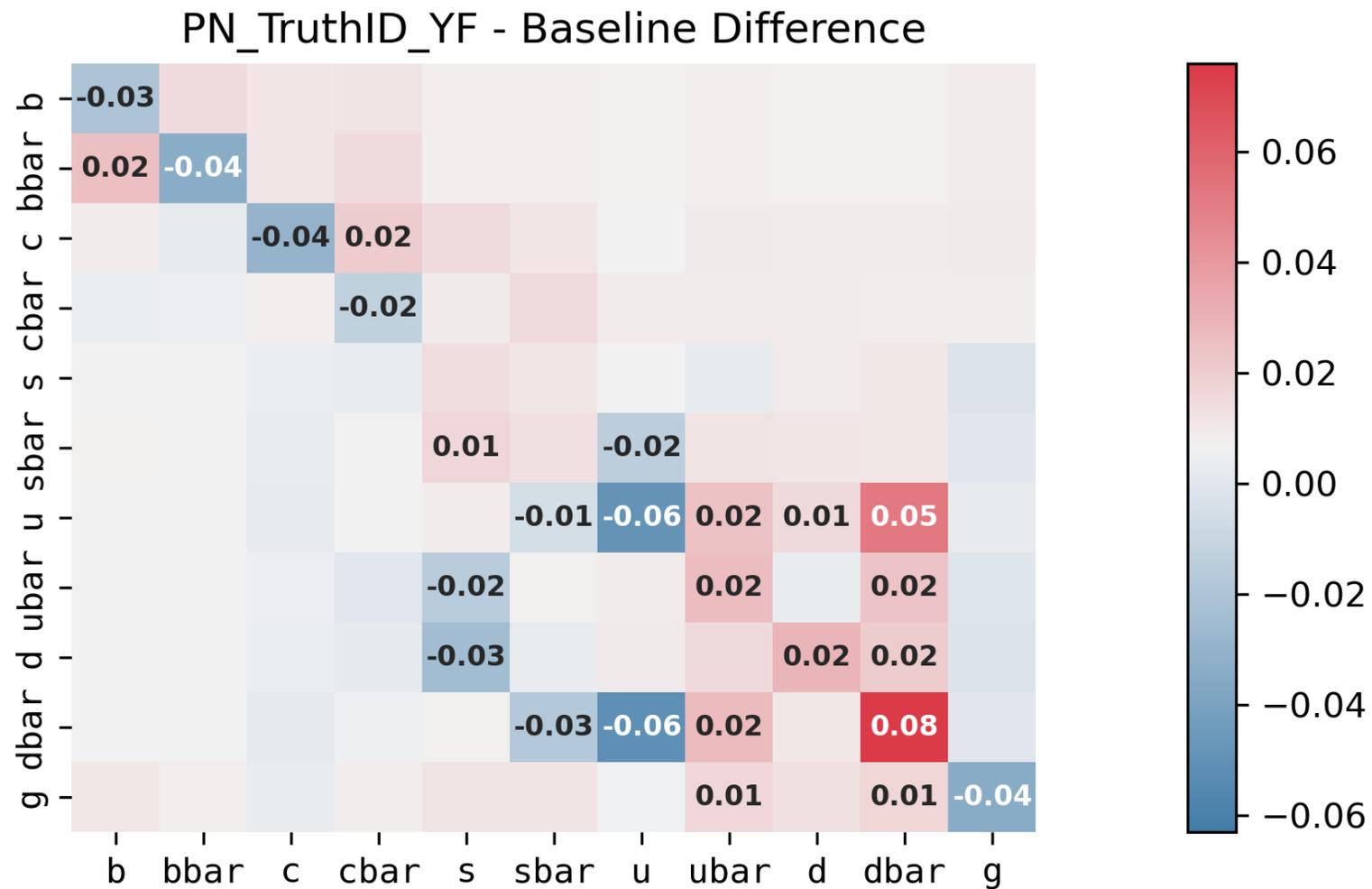
TDR/CDR, PN, truth ID:

0.5486: 0.5285

Matrix Difference

TDR improved from CDR in 2%.

PN_CDR_TruthID - Baseline Difference
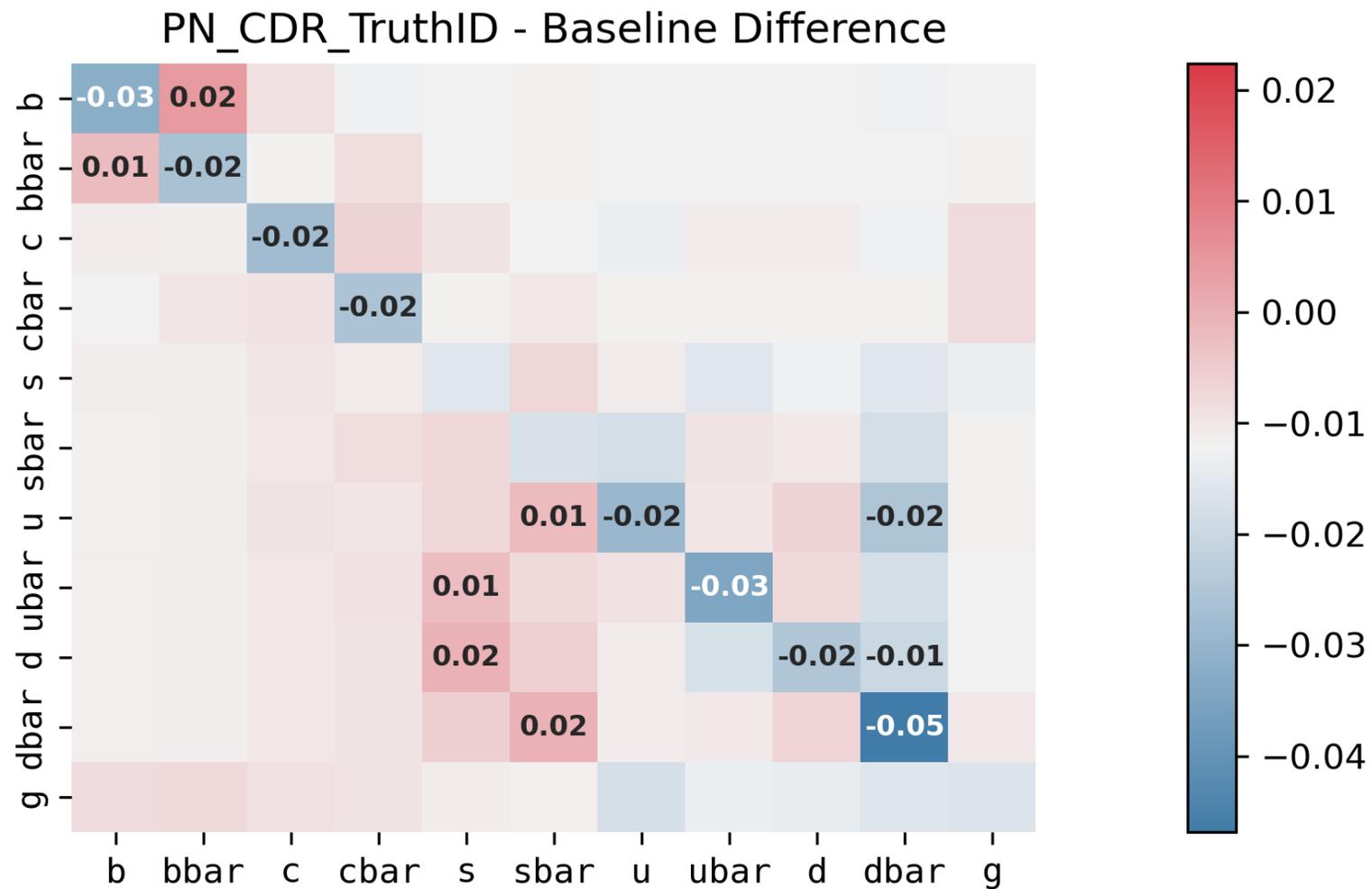
To dos

- Further check inputs/outputs for consistence, like costheta

- After sanity check, applications:

  - b/c/g/s tagging, H->bb/cc/gg/ss analysis

  - Ability for genializing: JOI to Zpole, to E240 ZZ/WW/qq

  - Package for users

  - …

Results from YF

ParT TDR RecoID70

- ParT TDR RecoID70:   0.5319

- PN TDR TruthID: 0.5486

- PN TDR RecoID70:   0.5075

- PN TDR RecoID70Charged: 0.4952

- PN CDR TruthID: 0.5285

Results from YF