

Non prompt J/ψ production in Pb-Pb at ALICE

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MC events

- HIJING prompt J/ψ production
- Non prompt J/ψ production via EvtGen (B-baryon and meson decays)
- Pb-Pb collisions 5.02 TeV

Cuts in dst production

P>1,
Eta [-0.9,0.9]
DCAxy [-1,+1],
DCAz [-3,+3],
nTPCcls [70,161]
ITSrefit,
TPCrefit
electron [-4,+4]
proton [-4,+1]

ele [-4,+4],
proton [-2,+2],
kaon [-2,+2]
ImpactParXY [-2,+2],
ImpactParZ [-3,+3],
nTPCCls [70,160],
Eta [-0.9,0.9]

Lambda Proton Cuts :

TPCpid cut for proton [-4,+4]
P > 0.8GeV
Eta < |1.6|
nTPCcls [70,160]
TPCrefit, ITSrefit

K0s pion cuts

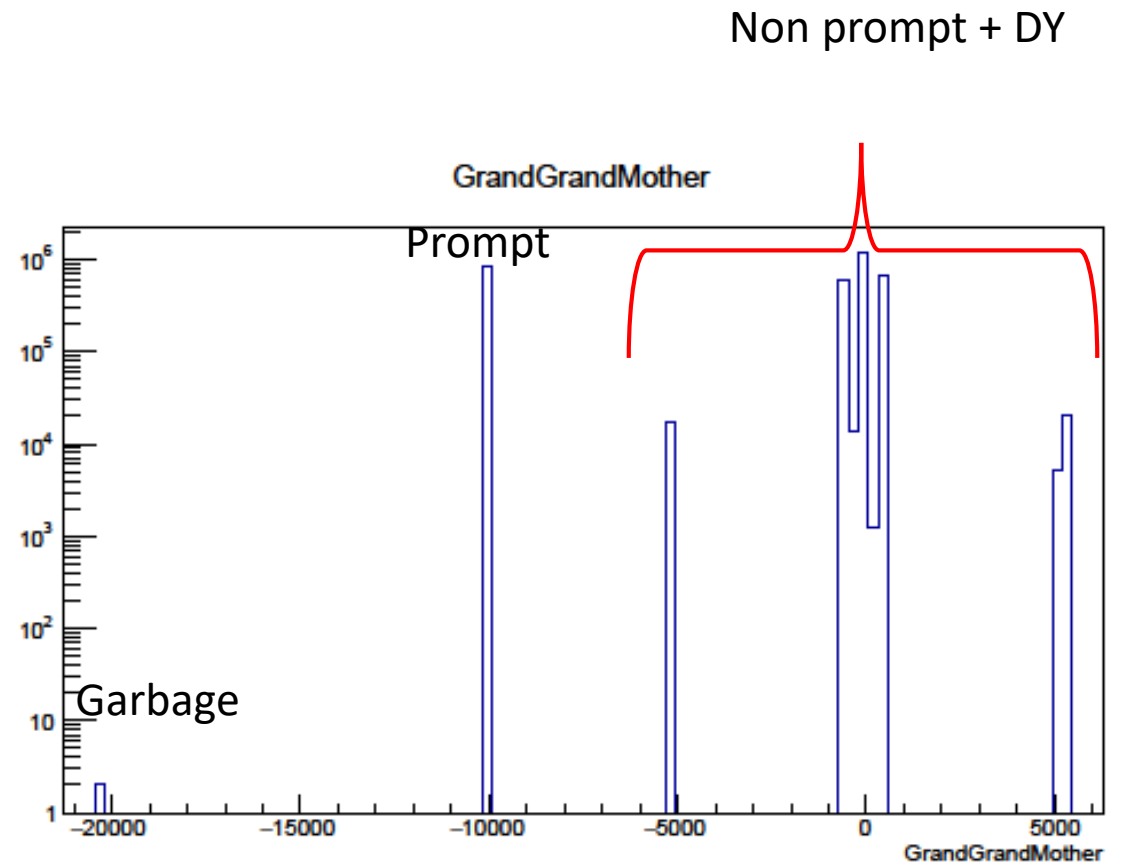
TPCpid cut for Pion [-4,+4]
P > 0.9GeV
Eta < |1.6|
nTPCcls [70,160]
TPCrefit, ITSrefit

GammaConvEE cuts

TPCpid cut for electron [-4,+4]
P > 0.7GeV
Eta < |1.2|
nTPCcls [70,160]
TPCrefit, ITSrefit

Training Model

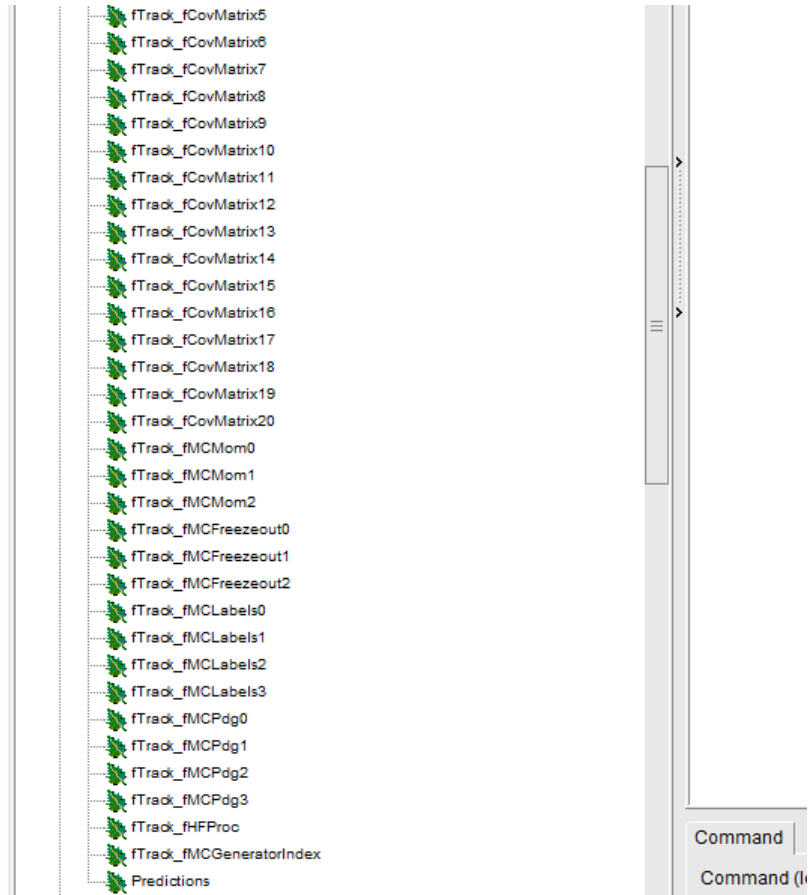
- Only $e^+ e^-$ final states selected in dst file
- 50/50 signal/background mixing
- Signal events – non prompt
- Background events – prompt
- Random selection of input vector observables as a first try
- Selection of events based on GrandGrandMother



The neural network interface

- ✓ Artificial Bayesian neural network build in TensorFlow 1.15
 - ✓ 25 input observables
 - ✓ 1 layer with 30 neurons
 - ✓ 2 output neurons representing the event class (S/B)
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- Ram Consumption
 - 3-4 Gb for the training phase
 - 14 Gb for reading and storing the weights in numPy array

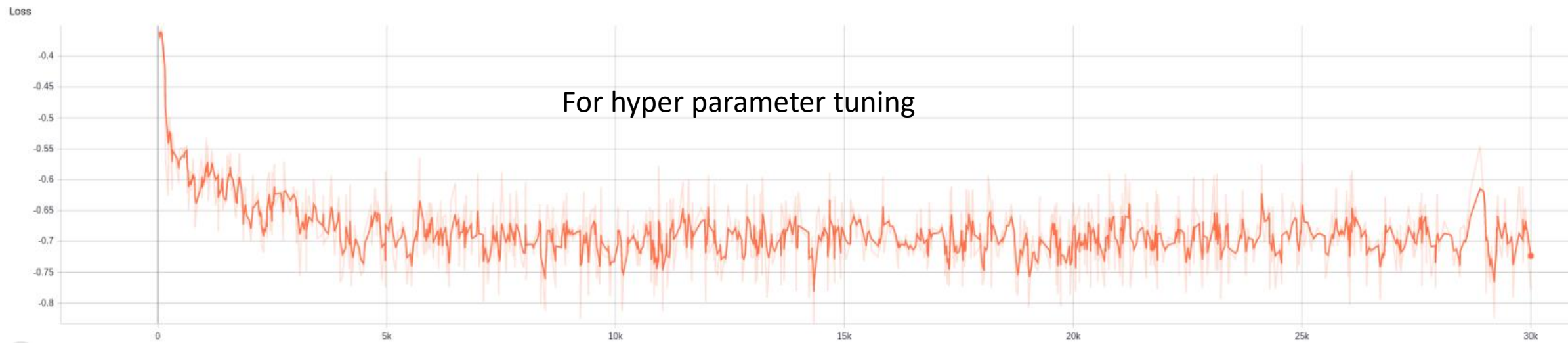
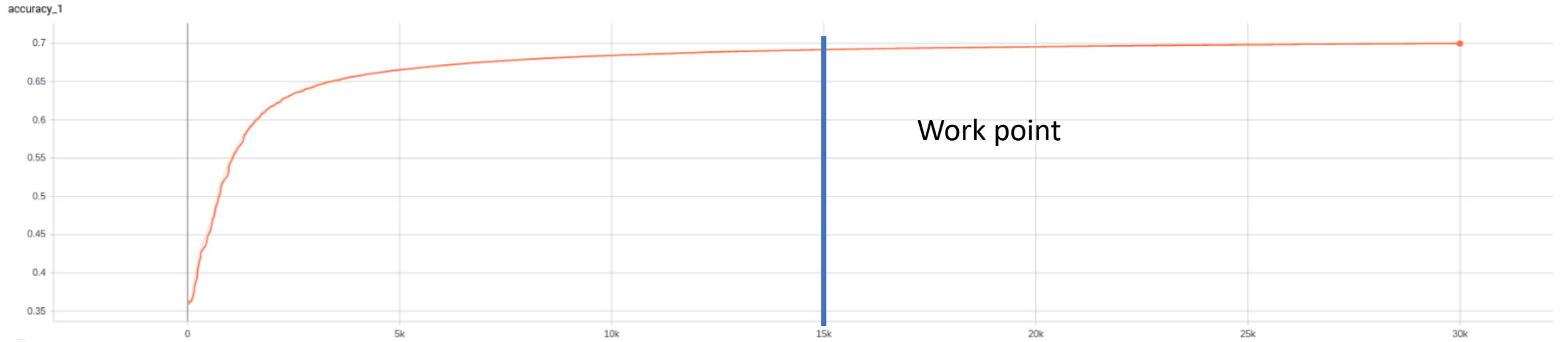
Output Format (uproot)



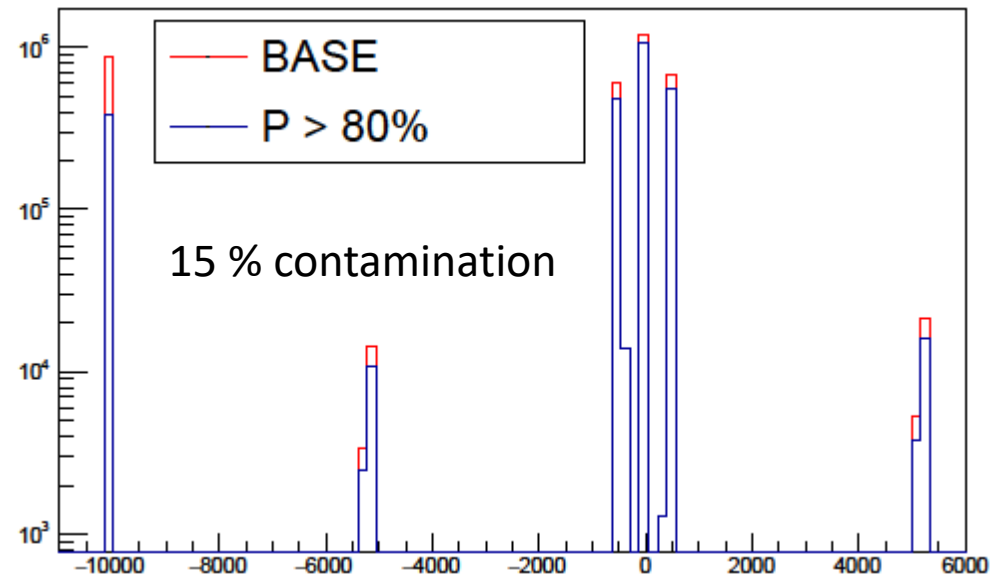
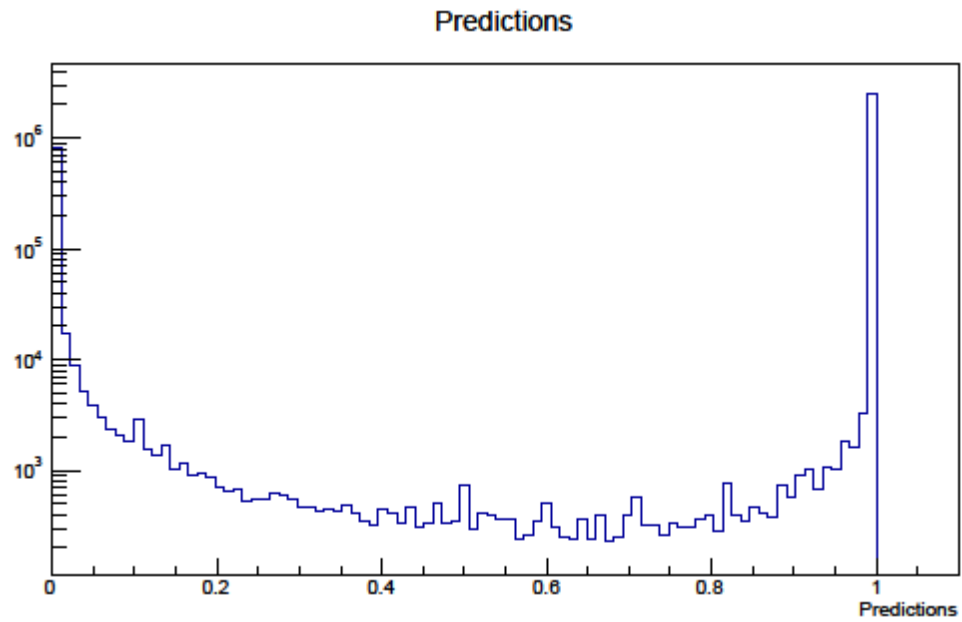
Observable used for training:

```
'fTrack_fP0',  
    'fTrack_fP1',  
    'fTrack_fP2',  
    'fTrack_fTrackParam0',  
    'fTrack_fTrackParam1',  
    'fTrack_fTrackParam2',  
    'fTrack_fTrackParam3',  
    'fTrack_fTrackParam4',  
    'fTrack_fTrackParam5',  
    'fTrack_fDCA0',  
    'fTrack_fDCA1',  
    'fTrack_fTPCDCA0',  
    'fTrack_fTPCDCA1',  
    'fTrack_fTPCCrossedRows',  
    'fTrack_fTOFbeta',  
    'fTrack_fCovMatrix0',  
    'fTrack_fCovMatrix1',  
    'fTrack_fCovMatrix2',  
    'fTrack_fCovMatrix3',  
    'fTrack_fCovMatrix4',  
    'fTrack_fCovMatrix5',  
    'fTrack_fCovMatrix6',  
    'fTrack_fCovMatrix7',  
    'fTrack_fCovMatrix8',  
    'fTrack_fCovMatrix9',
```

Neural network tuning



Results for 30k training iterations



Results for 15K iterations + PCA

Predictions

