

1 dictionary for first production

pt : transverse momentum of D0 candidate

mass : mass of D0 candidate

pTK : transverse momentum of kaon daughter (see **note 5**)

pTPi : transverse momentum of pion daughter

siliconHitsK : number of silicon hits (SSD+SVT) for kaon daughter

siliconHitsPi : number of silicon hits (SSD+SVT) for pion daughter

angle : angle of kaon daughter with the D0 momentum in D0 frame

momentum : momentum of D0 candidate

ffake : mass of D0 with kaon track rotated

SigmaK : ndEdx of kaon daughter

SigmaPi : ndEdx of pion daughter

pK : momentum of kaon daughter

pPi : momentum of pion daughter

flag : number of tracks in this event

dcaXY_K : distance of closest approach to primary vertex in transverse direction for the kaon daughter

dcaXY_Pi : distance of closest approach to primary vertex in transverse direction for the pion daughter

dcaZ_K : distance of closest approach to primary vertex in longitudinal direction for the kaon daughter

dcaZ_Pi : distance of closest approach to primary vertex in longitudinal direction for the pion daughter

sigmaDcaXY_K : error of DCA in transverse direction for the kaon daughter, see **note 1**

sigmaDcaXY_Pi : error of DCA in transverse direction for the pion daughter

sigmaDcaZ_K : error of DCA in longitudinal direction for the kaon daughter

sigmaDcaZ_Pi : error of DCA in longitudinal direction for the pion daughter

chargeK : sign of kaon daughter

chargePi : sign of pion daughter

DCAXY_p : see **note 2**

DCAZ_p : see **note 2**

trackXYT : distance between daughter tracks at the secondary vertex in transverse direction, see **note 6**

trackZT : distance between daughter tracks at the secondary vertex in longitudinal direction

decayXYT : distance between the primary and secondary vertex in transverse direction

gRefMult : multiplicity of tracks

slength_tcfits : signed decay length from TCFIT

dslength_tcfits : error or signed decay length

prob_tcfits : see **note 4**

chisq_tcfits : chisquare of the least square fit

rapD0 : rapidity of the D0 candidate

myLxy : see **note 3**

myAngle : see **note 3**

eta : pseudo-rapidity of D0 candidate

1.1 note 1

it's the quadratic sum of the single track error obtained from the covariance matrix and the error of the primary vertex

1.2 note 2

Spiros wanted this calculation when we started to work with MuKpi macro

```
StThreeVectorD PTOT = P0+P1; //sum of momentum of daughters
StThreeVectorD CROSS = decayC.cross(PTOT);
Double_t DCAXY_p = TMath::Sqrt(CROSS.x()*CROSS.x() + CROSS.y()*CROSS.y());
DCAXY_p = DCAXY_p/PTOT.mag();
Double_t DCAZ_p = CROSS.z()/PTOT.mag();
```

1.3 note 3

myLxy and myAngle refers to :

calculation of angle a-la-HFT : angle>.98 in lab Frame

```
TVector3 dec(0,0,0);
dec.SetX(decayT.x());
dec.SetY(decayT.y());
dec.SetZ(decayT.z());
TVector3 pTot(0,0,0);
pTot.SetX(PTOT.x());
pTot.SetY(PTOT.y());
pTot.SetZ(PTOT.z());
float myangle = dec.Angle(pTot); [angle btw the line joining the PV and SV and the momentum of D0]
```

```
Float_t Lxy = 0;
Float_t D0px = PTOT.x();
Float_t D0py = PTOT.y();
Lxy = (1/TMath::Sqrt(D0px*D0px + D0py*D0py)) * (D0px*decayC.x() + D0py*decayC.y()); [Lxy is the
2D decay length projected on the D0 momentum ]
```

1.4 note 4

It comes from the root definition :

<http://root.cern.ch/root/html526/TMath.html#TMath:Prob>

P(a,x) represents the probability that the observed Chi-squared for a correct model should be less than the value chi2.

1.5 note 5

kaon daughter is chosen by assuming the kaon mass for a given track (the same is done for the pion daughter)

1.6 note 6

This uses THelixTrack

2 cuts

- EVENT level
 1. triggerId : 200001, 200003, 200013
 2. Primary vertex position along the beam axis : $|z_{\text{vertex}}| < 10$ cm
 3. Resolution of the primary vertex position along the beam axis: $|z_{\text{vertex}}| < 200 \mu\text{m}$
- TRACKS level
 1. Number of hits in the vertex detectors : SiliconHits>2 (tracks with sufficient DCA resolution)
 2. Momentum of tracks $p > .5 \text{GeV}/c$
 3. Number of fitted TPC hits > 20
 4. $|\eta| < 1$
 5. dEdxTrackLength>40 cm
 6. DCA to Primary vertex (transverse) $\text{DCA}_{xy} < .1$ cm
- DECAY FIT level
 1. Probability of fit > 0.1
 2. $|\text{slength}| < 0.1$
 3. Particle identification : ndEdx : $|\text{n}\sigma_K| < 2, |\text{n}\sigma_{\pi}| < 2$