

Andrew Schick

March 1, 2019

p^+ = 4 momentum of positron

p^- = 4 momentum of electron

w = Weight factor

$w_1 = p_x^+ \cdot p_x^+ + p_y^+ \cdot p_y^+ + m \cdot m$

$w_2 = p_x^- \cdot p_x^- + p_y^- \cdot p_y^- + m \cdot m$

$m = 0.000511$ GeV

$$J_x = \frac{p_x^+}{w_1} + \frac{p_x^-}{w_2} \quad J_y = \frac{p_y^+}{w_1} + \frac{p_y^-}{w_2}$$

$$\text{if } (J_y > 0) \quad \phi_J = \arccos\left(\frac{J_x}{\sqrt{J_x^2 + J_y^2}}\right), \quad \text{else} \quad \phi_J = \pi - \arccos\left(\frac{J_x}{\sqrt{J_x^2 + J_y^2}}\right)$$

```
double JWeight1 = locThrown1P4.X()*locThrown1P4.X() + locThrown1P4.Y()*locThrown1P4.Y()  
+ ElectronMass*ElectronMass;
```

```
double JWeight2 = locThrown2P4.X()*locThrown2P4.X() + locThrown2P4.Y()*locThrown2P4.Y()  
+ ElectronMass*ElectronMass;
```

```
double Jx = (locThrown1P4.X()/JWeight1) + (locThrown2P4.X()/JWeight2);
```

```
double Jy = (locThrown1P4.Y()/JWeight1) + (locThrown2P4.Y()/JWeight2);
```

```
double Jphi = 0;
```

```
if(Jy > 0)
```

```
{
```

```
Jphi = acos(Jx / (sqrt(Jx*Jx + Jy*Jy) ) ) * 180/PI;
```

```
}
```

```
else {
```

```
Jphi = (PI - acos(Jx/( sqrt(Jx*Jx + Jy*Jy) ) )) * 180/PI;
```

```
}
```

```
dHist_Jphi->Fill(Jphi);
```