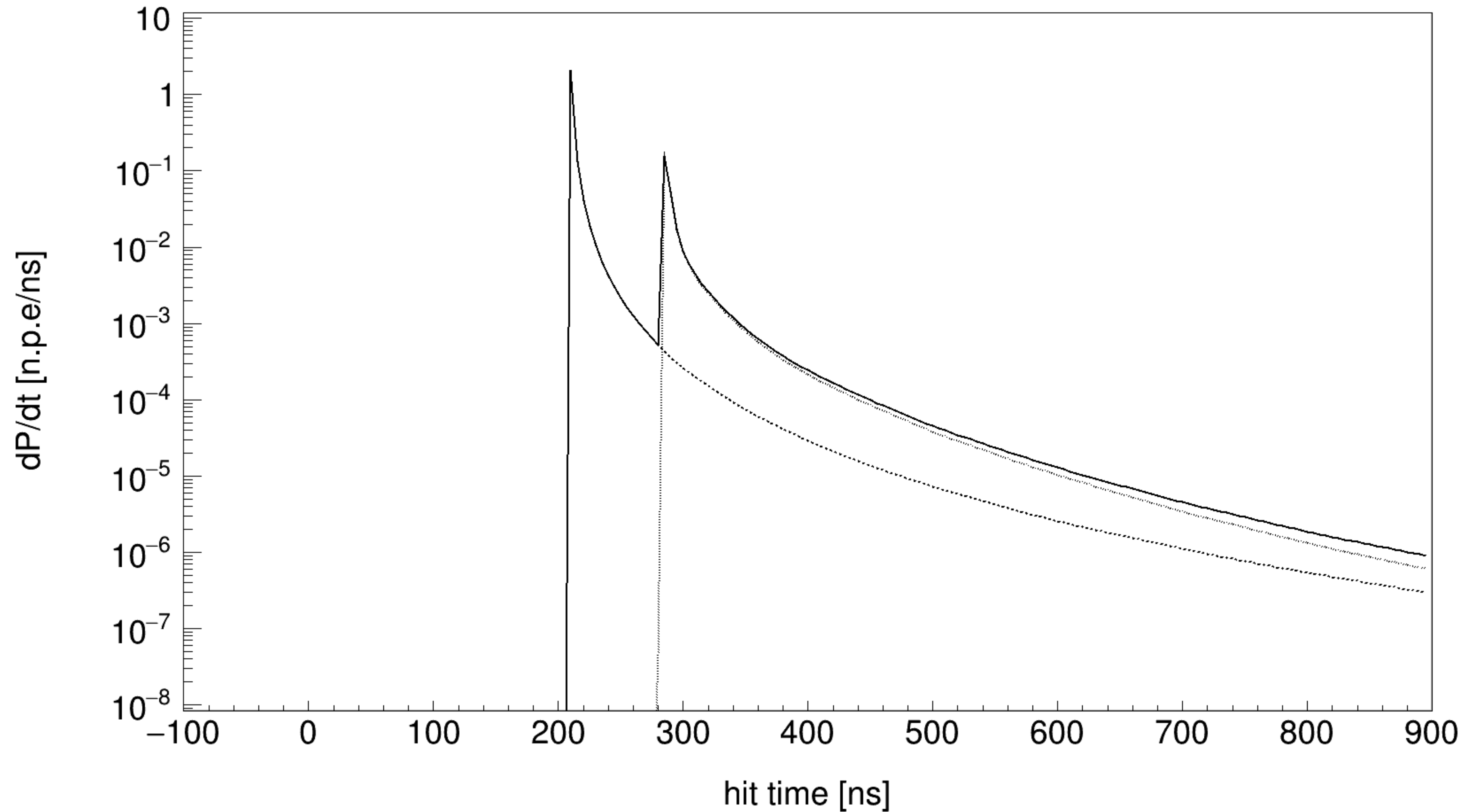


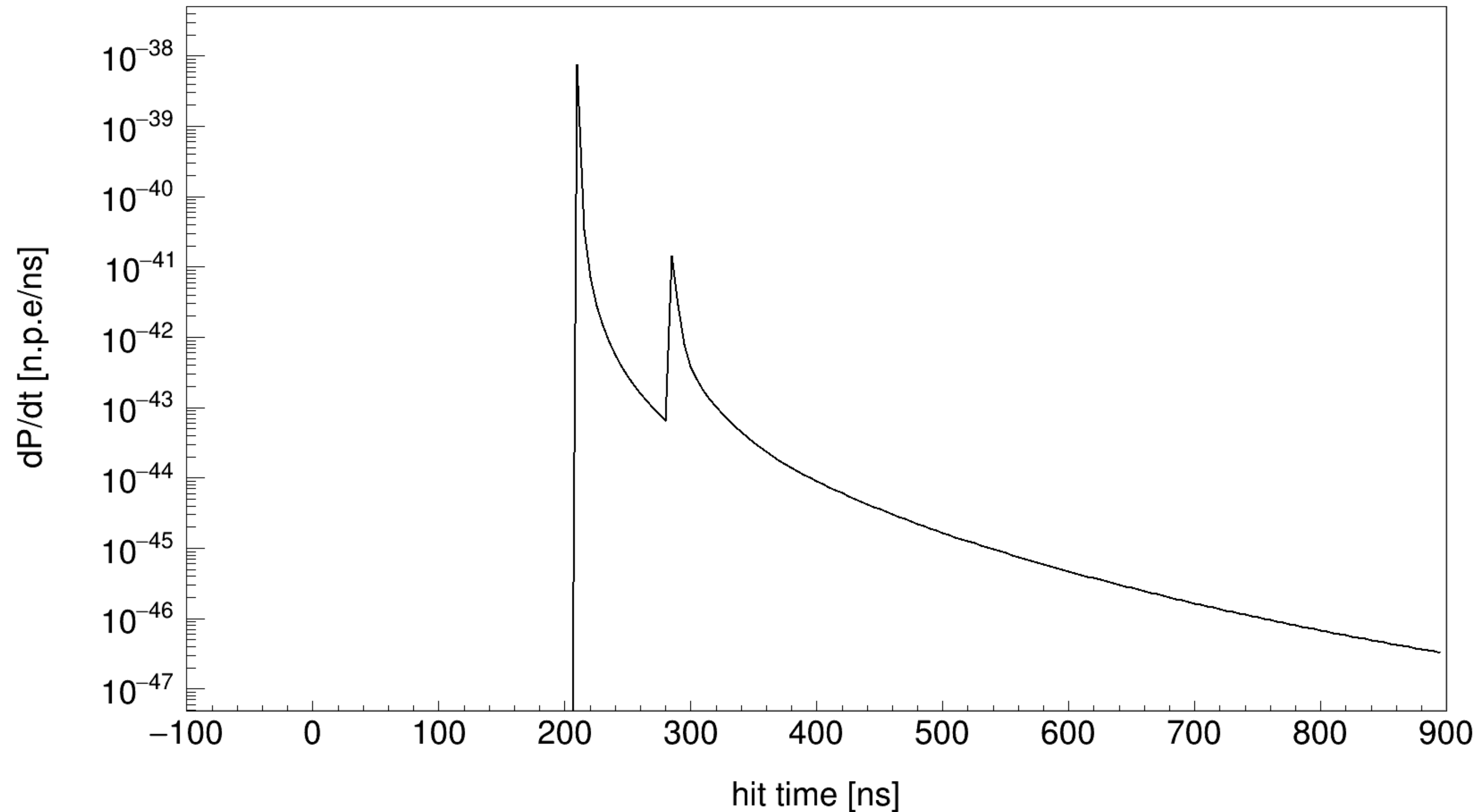
- Hit right ahead of event - $R = 0.1$ m (extremely close)

vertex (0,0,0), 'SOUTH', muon dir (0 0 1), shower dir (-0.492941 0 0.870063), hit pos (0, 0, 60), Emuon 10^3 GeV, Eshower 10^3 GeV, cd ~ 1, R = 0.1, angle diff. = 29 deg



- Hit right ahead of event (0,0,60) - $R = 0.1$ m (extremely close)
- First hit probability follows similar shape??

vertex (0,0,0), 'SOUTH', muon dir (0 0 1), shower dir (-0.492941 0 0.870063), hit pos (0, 0, 60), E_{muon} 10³ GeV, E_{shower} 10³ GeV, cd ~ 1, R = 0.1, angle diff. = 29 deg

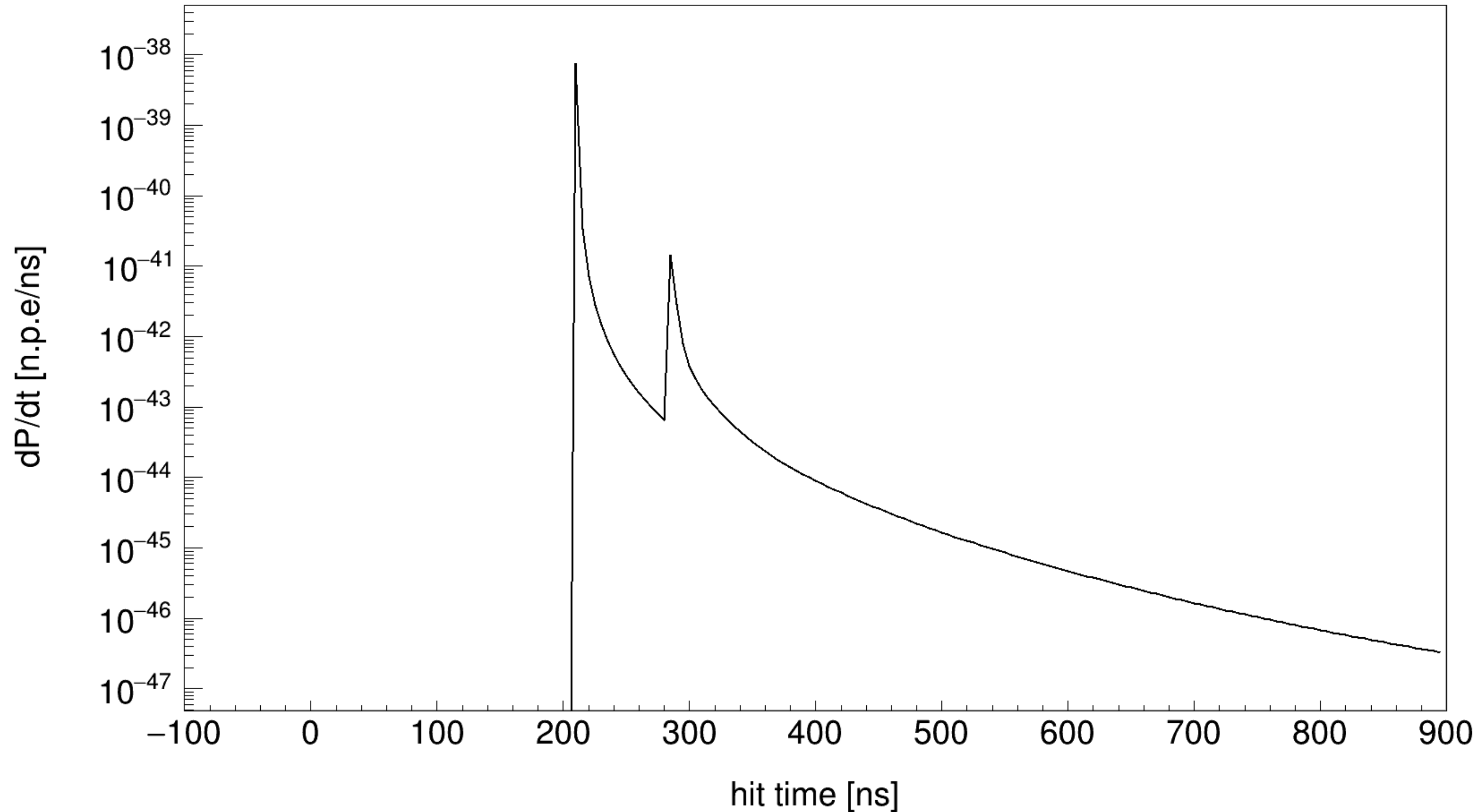


- Hit right ahead of event (0,0,60) - R = 0.1 m (extremely close)

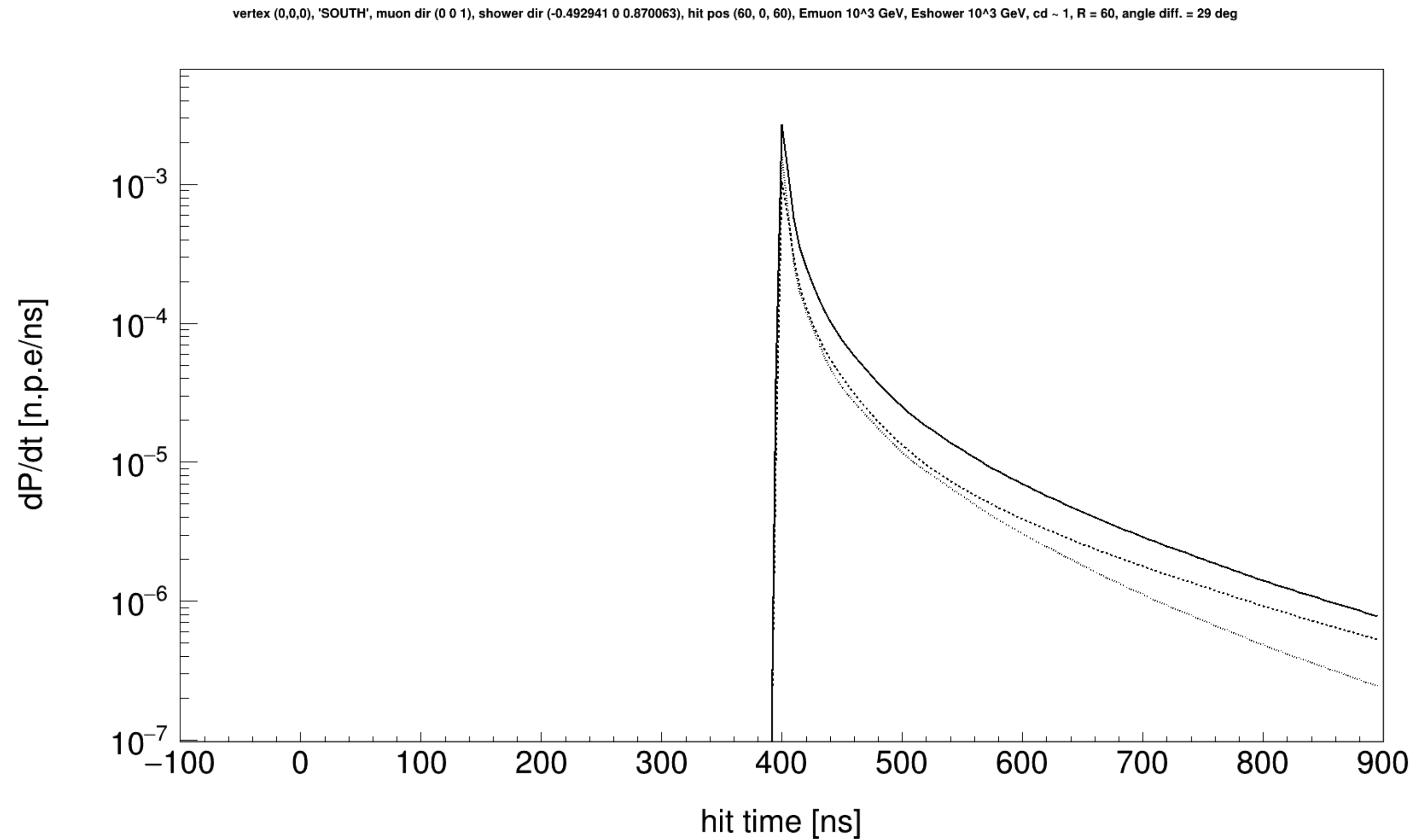
```
muon PDF values      0.0186471.f  91.6892 .v  91.9072 .V  2.82156e-42 PDFmuon.getP()  
shower PDF values   0.f  0 .v  0 .V  -nan PDFshower.getP()  
combined PDF values 0.0186471.f 91.6892 .v 91.9072 .V 2.82156e-42 combined.getP()
```

- Near peak..

vertex (0,0,0), 'SOUTH', muon dir (0 0 1), shower dir (-0.492941 0 0.870063), hit pos (0, 0, 60), E_{muon} 10³ GeV, E_{shower} 10³ GeV, cd ~ 1, R = 0.1, angle diff. = 29 deg

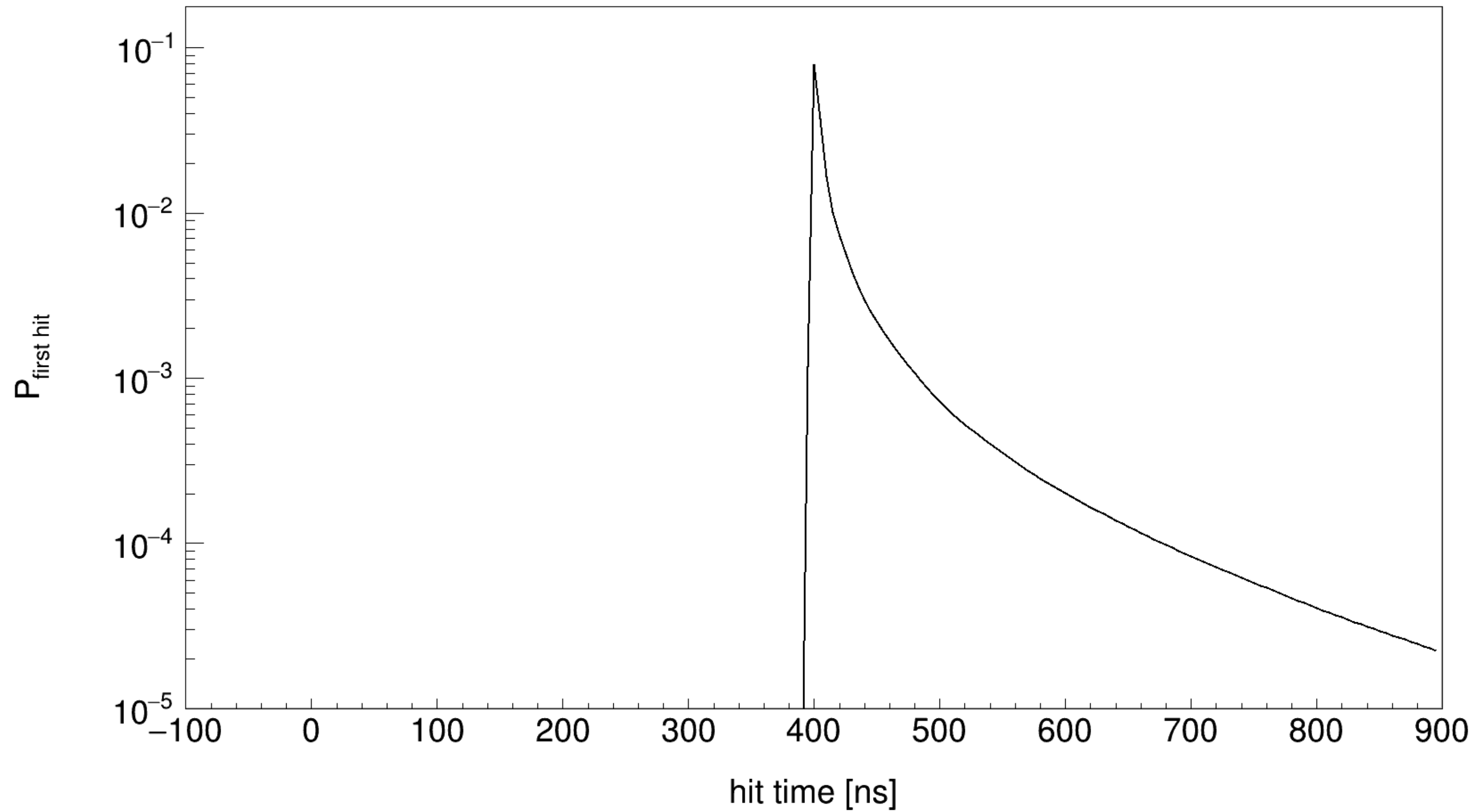


- Shift hit to (60,0,60) — $R = 60$



- Shift hit to (60,0,60) - $R = 60$
- Still similar shape?

vertex (0,0,0), 'SOUTH', muon dir (0 0 1), shower dir (-0.492941 0 0.870063), hit pos (60, 0, 60), E_{muon} 10³ GeV, E_{shower} 10³ GeV, cd ~ 1, R = 60, angle diff. = 29 deg

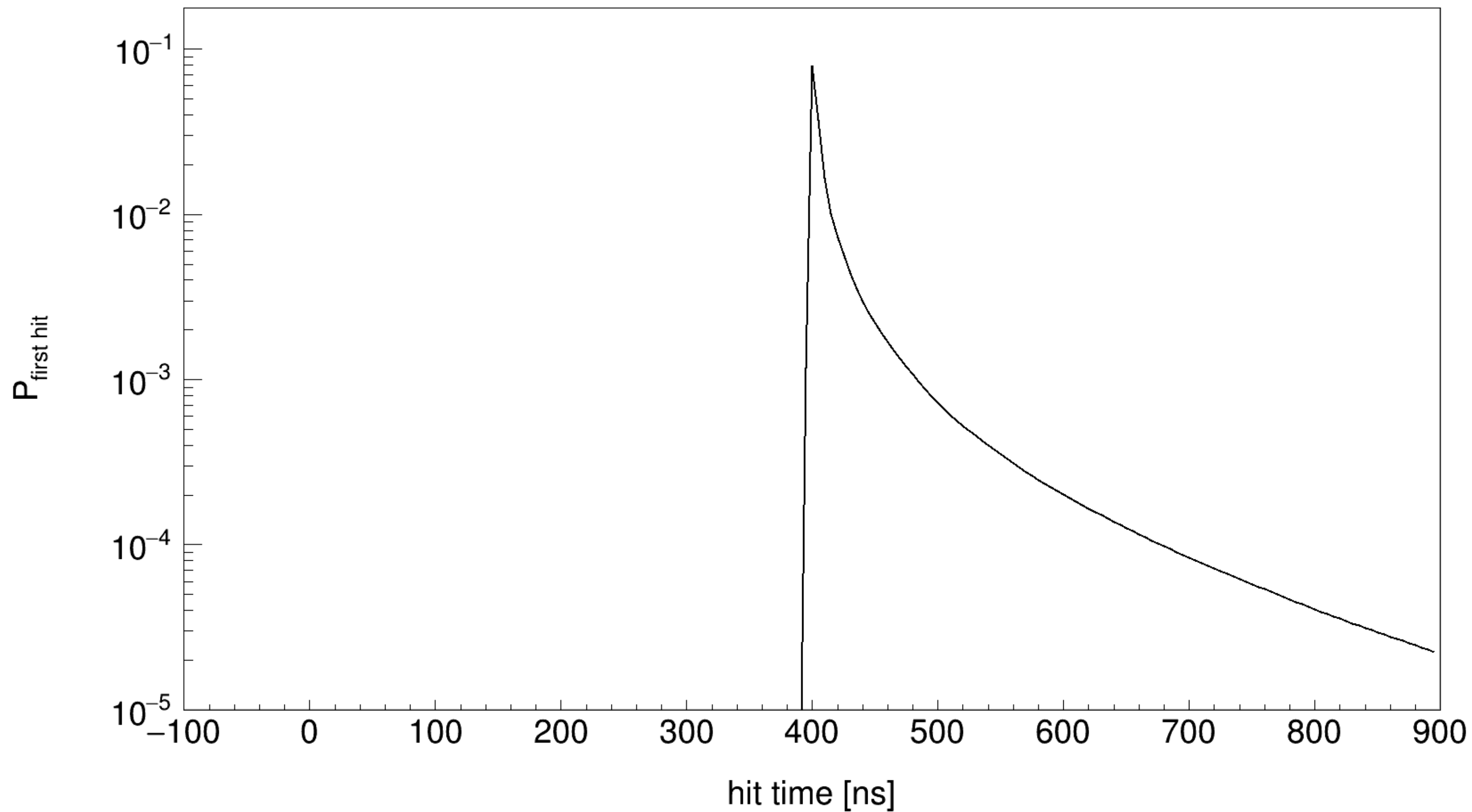


- Shift hit to (60,0,60) - R = 60

- Near peak..

```
muon PDF values      0.00104698.f  0.00276365 .v  0.0155494 .V  0.0676703 PDFmuon.getP()  
shower PDF values   0.00161955.f  0.00521232 .v  0.0185381 .V  0.0877171 PDFshower.getP()  
combined PDF values 0.00266653.f 0.00797597 .v 0.0340875 .V 0.0789348 combined.getP()
```

vertex (0,0,0), 'SOUTH', muon dir (0 0 1), shower dir (-0.492941 0 0.870063), hit pos (60, 0, 60), E_{muon} 10³ GeV, E_{shower} 10³ GeV, cd ~ 1, R = 60, angle diff. = 29 deg



```
JPDF_shower_t::result_type combinedPDF = PDFmuon_hit + PDFshower_hit;
```

```
//cout << combinedPDF.f << ".f " << combinedPDF.v << " .v " << combinedPDF.V << " .V " << endl;
```

```
double p = combinedPDF.getP();
```

getP

```
475     /**
476     * Get probability of first hit.\n
477     * The probability is defined at the moment JResultPDF::f and JResultPDF::v have been evaluated
478     * and it is normalised to the total interval corresponding to JResultPDF::V.
479     *
480     * \return          probability
481     */
482     double getP() const
483     {
484         return exp(-v) * f / (1.0 - exp(-V));
485     }
```