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Subject: the simulation of  $ep \rightarrow e \Delta(1910)^+$ ,  $\Delta(1910)^+ \rightarrow \Sigma(1385)^0 K^+$

Posted by [Xinying Song](#) on Wed, 27 Apr 2016 09:51:43 GMT

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Hi,

I want to simulate the process of  $ep \rightarrow e \Delta(1910)^+$ ,  $\Delta(1910)^+ \rightarrow \Sigma(1385)^0 K^+$ . My code is like this:

```
#include "TGraphAsymmErrors.h"
#include "TH1.h"
#include "TH2.h"
#include "TH3.h"
#include "TChain.h"
#include "TCanvas.h"
#include "TF1.h"
#include "TGraphAsymmErrors.h"
#include "TFile.h"
#include "TSystem.h"

#include "PParticle.h"
#include "PInclusiveModel.h"
#include "PReaction.h"
#include "PBeamSmearing.h"
#include "PAnyDistribution.h"
#include "plugins/scatter_mod/PScatterCrossSection.h"
#include "plugins/sigmatoLee/PSigmatoLee.h"

void tmp_YtoLambdae() //int input, int events
{
    int events = 100;
    int input = 10;
    double ebeam = 11.0;
    bool xsection = 1;
    gROOT->Reset();
    PUtls::SetSeed(input*1000);
    makeStaticData()->AddParticle(70,"Sigma13850", 1.3837);
    makeStaticData()->SetParticleTotalWidth("Sigma13850",0.0360);
    makeStaticData()->SetParticleBaryon("Sigma13850",1);
    makeStaticData()->SetParticleLMass("Sigma13850",1.115);
    makeStaticData()->AddDecay("Sigma13850 --> Lambda + dilepton", "Sigma13850", "Lambda, dilepton", 1.0);
    //makeStaticData()->AddDecay("dilepton --> e+ + e-", "dilepton", "e+, e-", 1.0);

    makeStaticData()->AddParticle(71,"Delta1910+", 1.910);
    makeStaticData()->SetParticleTotalWidth("Delta1910+",0.340);
```

```

makeStaticData()->SetParticleBaryon("Delta1910+",1);
makeStaticData()->SetParticleLMass("Delta1910+",1.89);
makeStaticData()->AddDecay("Delta1910+ --> Sigma13850 + K+", "Delta1910+",
"Sigma13850, K+", 1.0);
//~~~~//makeStaticData()->AddDecay("Lambda --> p + pi- + dilepton", "Lambda", "p, pi-,
dilepton",1.0);

```

```

PAnyDistribution* decay =
new PAnyDistribution("v_slope", "A function to add a new t-slope");
decay->Add("q, parent");
decay->Add("e-, daughter");
decay->Add("Delta1910+, daughter");
TH1F * cache = new TH1F ("cache","v cache",400,0,11.0);
decay->AddEquation(cache,"beam = _parent->GetBeam(); beam->Boost(_parent) ; t1 =
(beam - [e-,1])->E(); _x = t1;");
decay->AddEquation("_f = exp(-1000*t1);");
makeDistributionManager()->Add(decay);

```

```

PScatterCrossSection *model = new PScatterCrossSection("mymodel","My cross section");
model->Add("e-,grandparent,beam");
model->Add("p,grandparent,target");
model->Add("q,parent");
model->Add("e-,daughter,spectator");
model->Add("Delta1910+,daughter,primary");

```

```

double M_P = 0.938272; //Proton mass
double M_el = 0.000510999; //Electron mass

```

```

//Define the range of the c.m. sampling
double En_beam = TMath::Sqrt(ebeam*ebeam + M_el*M_el);
double q= TMath::Sqrt((2.*En_beam*M_P)+(M_P*M_P) + (M_el*M_el));
double q_min = q - q/10000.;
double q_max = q + q/10000.;
//Now let set up the model

```

```

model->SetRange(q_min,q_max);
model->SetNpy(250);
model->SetNpx(250); //Use this after SetNpy analysis
makeDistributionManager()->Add(model);

```

```

//Set up reaction as usual
char lund_file[75];

```

```

cout<<"#####
####"<<endl;
cout<<"##### Cross-Section Genertation is occuring
#####<<endl;

```

```

cout<<"#####
####"<<endl;
    sprintf(lund_file,"%s","etaPXSection.lund");
/////////distribution of Sigma1385_0 to Lambda dilepton
PSigmatoLee *sigmadecaytoLee = new
PSigmatoLee("sigma13850_to_e+_e-_lambda_matrix","sigma13850 to e+e-_Lambda
Distribution");
sigmadecaytoLee->Add("Sigma13850,parent");
sigmadecaytoLee->Add("Lambda,daughter");
sigmadecaytoLee->Add("dilepton,primary");
sigmadecaytoLee->SetMax(0.2);
makeDistributionManager()->Add(sigmadecaytoLee);

    PReaction *my_reaction = new PReaction("_P1 = 11.0","e-","p","e- Delta1910+ [Sigma13850
[dilepton Lambda] K+],"YtosigmaK",0,0,0,0);

    my_reaction->Preheating(500);
    my_reaction->Print();
    my_reaction->Loop(events);
//

}

```

Here is the class written by myself which is put in /Pluto/pluto\_v5.43/plugins/. I put it in the attachment and

There are errors like this when I run it,

it came out so many

Warning in <PDalitzDecay::dGdM>: Unknown decay

I look up this sentence in PDalitzDecay.cc, it may be because of there is no Dalitz decay of sigma13850->Lambda dilepton,though I definid this decay in plugins, So how to solve this problem?

## File Attachments

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- 1) [PSigmatoLee.h](#), downloaded 486 times
  - 2) [PSigmatoLee.cc](#), downloaded 492 times
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