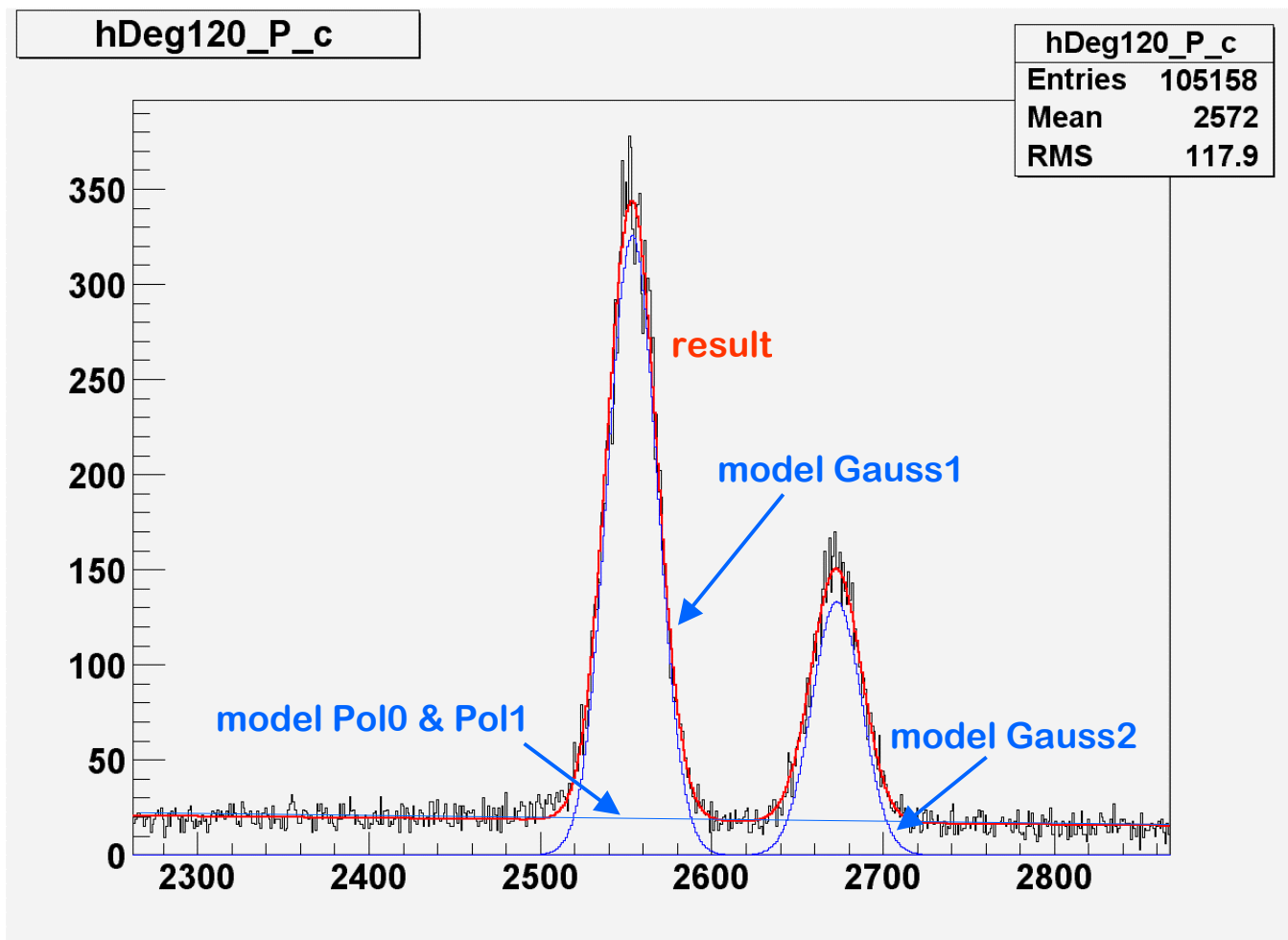


Examples of Go4Fitter Presentation (25.7.2002)

Example 1: Two Gaussians



```

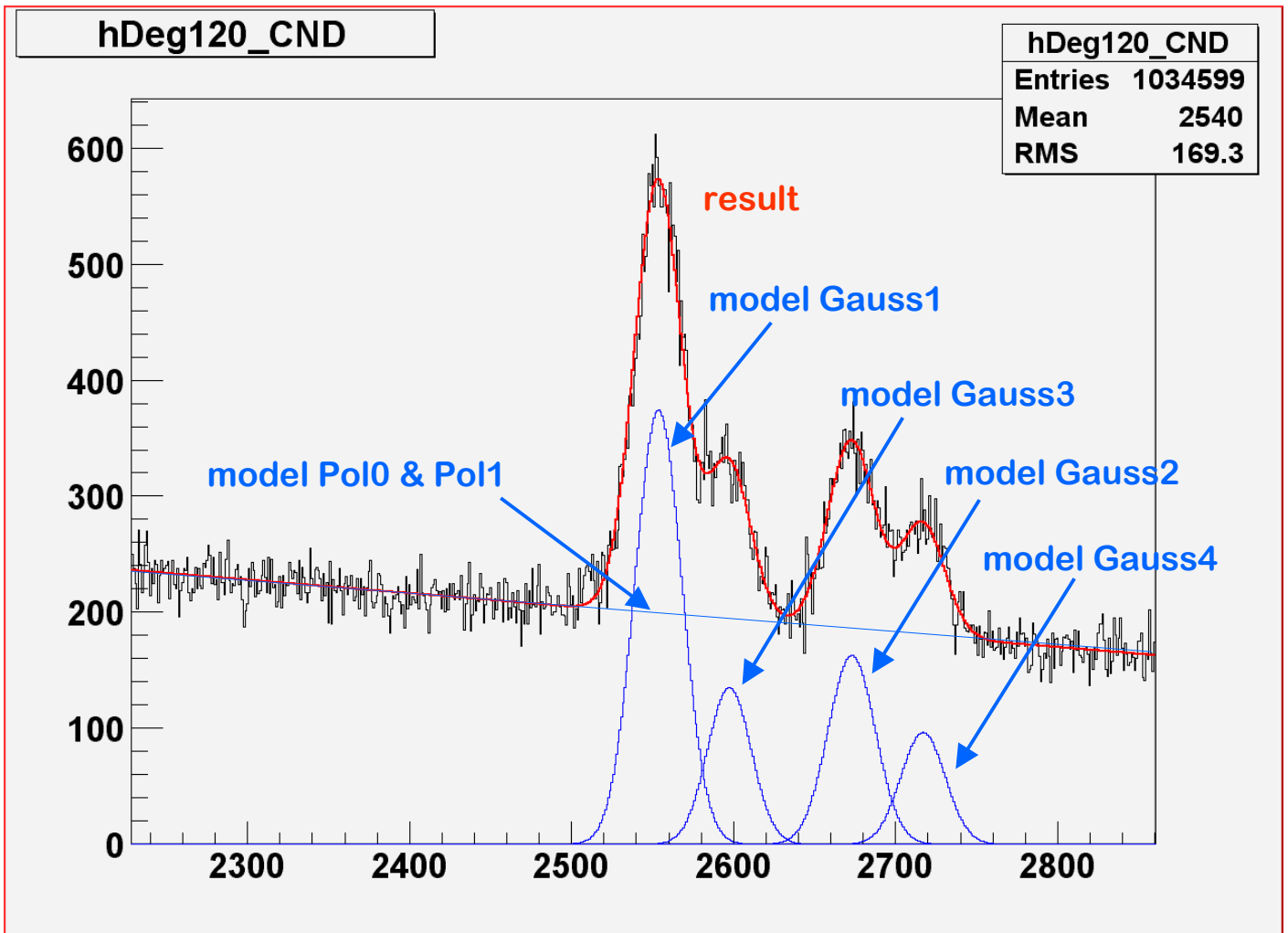
void Example1() { // Fit two Gauss peaks with background

// create fitter and select method:
TGo4Fitter* fitter = new TGo4Fitter("Fitter","Example fitter object");
fitter->SetFCNType(TGo4Fitter::fc_n_ML_Poisson); // maximum likelihood
// create minimizer:
TGo4FitMinuit *fMinuit = new TGo4FitMinuit("Minuit","Minimization object");
fMinuit->AddCommand("MIGRAD 500 1"); // Command for Minuit
fitter->SetMinimizer(fMinuit);
// create object to fit (histogram):
TH1D* histo = GetHistogram("hDeg120_P_c"); // get a histogram
TGo4FitDataHistogram *data = new TGo4FitDataHistogram("data1",histo);
data->SetUseBinScale(kTRUE); // X-values are bin number
data->SetRange(0,2200.,2900.); // Fit range
// add data object to fitter:
fitter->AddData(data);
// create four models and add to fitter:
fitter->AddModel("data1", new TGo4FitPolynom("Pol0",0) ); // for background
fitter->AddModel("data1", new TGo4FitPolynom("Pol1",1) ); // for background
fitter->AddModel("data1", new TGo4FitGauss1("Gauss1",350.,2552.8,14.3) );
fitter->AddModel("data1", new TGo4FitGauss1("Gauss2",150.,2671.6,11.2) );
// Prepare fitter:
fitter->Initialize();
// Optional optimization:
fitter->CalculateAmplitudes();
// Fit:
fitter->DoMinimization();
// Get the result as same type as data object (histogram):
TH1* result = (TH1*) fitter->CreateResult("data1");
// Close fit (CreateResult off):
fitter->Finalize();
// Draw data histogram and fit curve(s):
DrawTwoHistograms("Example",histo,result);

delete fitter;
}

```

Example 2: Add two more Gaussians and another histogram



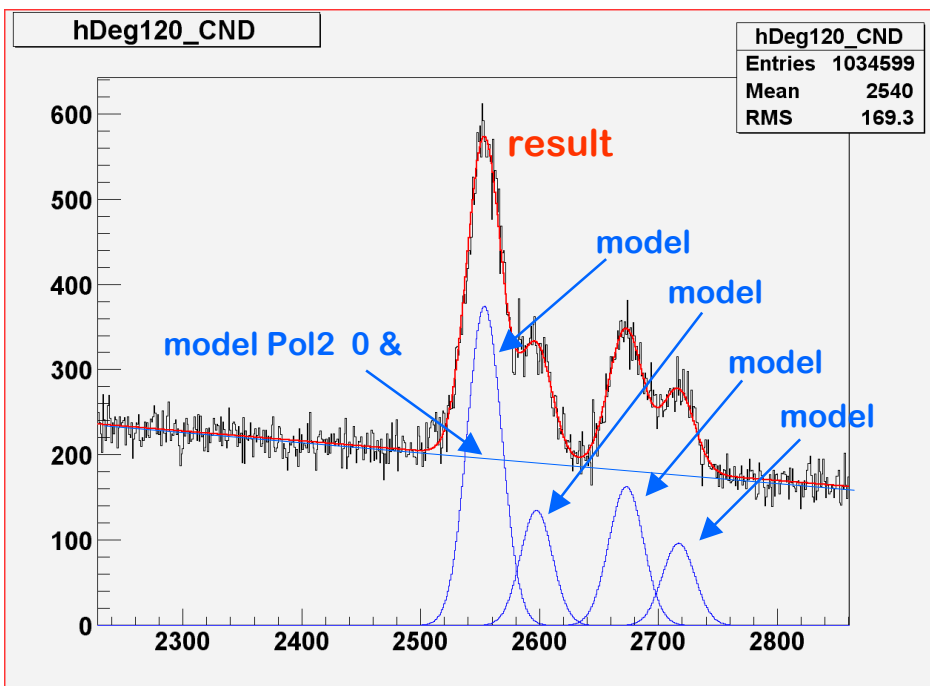
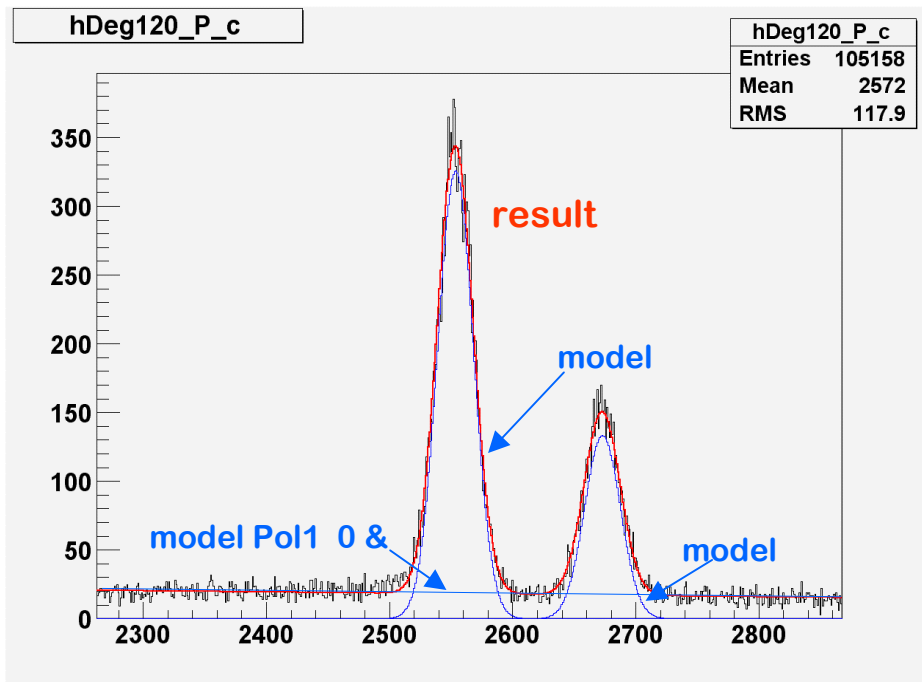
```

void Example2() { // Do a fit, modify it, and fit again
// same as example 1 :
TGo4Fitter* fitter = new TGo4Fitter("Fitter","Example fitter object");
fitter->SetFCNType(TGo4Fitter::fcn_ML_Poisson); // maximum likelihood
TGo4FitMinuit *fMinuit = new TGo4FitMinuit("Minuit","Minimization object");
fMinuit->AddCommand("MIGRAD 500 1"); // Command for Minuit
fitter->SetMinimizer(fMinuit);
TH1D* histo = GetHistogram("hDeg120_P_c"); // get a histogram
TGo4FitDataHistogram *data = new TGo4FitDataHistogram("data1",histo);
data->SetUseBinScale(kTRUE);
data->SetRange(0,2200.,2900.);
fitter->AddData(data);
fitter->AddModel("data1", new TGo4FitPolynom("Pol0",0) ); // for background
fitter->AddModel("data1", new TGo4FitPolynom("Pol1",1) ); // for background
fitter->AddModel("data1", new TGo4FitGauss1("Gauss1",350.,2552.8,14.3) );
fitter->AddModel("data1", new TGo4FitGauss1("Gauss2",150.,2671.6,11.2) );
fitter->Initialize();
fitter->CalculateAmplitudes();
fitter->DoMinimization();
TH1* result = (TH1*) fitter->CreateResult("data1");
fitter->Finalize();
// Up to here same as example 1
// Now we modify the fitter and the object to be fit
// Add two more models (peaks) to the fitter
fitter->AddModel("data1", new TGo4FitGauss1("Gauss3", 130.,2596.5,14.8) );
fitter->AddModel("data1", new TGo4FitGauss1("Gauss4", 100.,2725.0,10.0) );
TH1D* histo2 = GetHistogram("hDeg120_CND"); // get another histogram
data->SetHistogram(histo2); // fit object is now histo2
fitter->Initialize();
fitter->CalculateAmplitudes();
fitter->DoMinimization();
TH1* result2 = (TH1*) fitter->CreateResult("data1");
fitter->Finalize();
DrawTwoHistograms("Example",histo,result); // first fit as before
DrawTwoHistograms("Example",histo2,result2); // second fit

delete fitter;
}

```

Example 3: Combined fit



Build a fitter

```
TGo4Fitter * BuildFitter() {
// Fit two peaks in two histograms and two more in one of them

    TGo4Fitter* fitter = new TGo4Fitter("Fitter","Example fitter object");

// create first object to fit, but specify histogram later:
TGo4FitDataHistogram *data1 = new TGo4FitDataHistogram("data1",0);
data1->SetRange(0,2.2,2.9);
// Use a linear calibration for data1:
TGo4FitLinearCalibration *cali1 = new TGo4FitLinearCalibration(
    "cali1","axis calibration");

cali1->SetCalibrationByRange(3800,0.,3.8);
data1->SetCalibration(0,cali1,kTRUE);
fitter->AddData(data1);
fitter->AddModel("data1", new TGo4FitPolynom("Pol1_0",0) ); // for background
fitter->AddModel("data1", new TGo4FitPolynom("Pol1_1",1) ); // for background
fitter->AddModel("data1", new TGo4FitGauss1("Gauss1_1",350.,2552.8,14.3) );
fitter->AddModel("data1", new TGo4FitGauss1("Gauss1_2",150.,2671.6,11.2) );

// create second object to fit, but specify histogram later:
TGo4FitDataHistogram *data2 = new TGo4FitDataHistogram("data2",0);
data2->SetRange(0,2.2,2.9);
TGo4FitLinearCalibration *cali2 = new TGo4FitLinearCalibration(
    "cali2","axis calibration");

cali2->SetCalibrationByRange(3800,0.,3.8);
data2->SetCalibration(0,cali2,kTRUE);
fitter->AddData(data2);
fitter->AddModel("data2", new TGo4FitPolynom("Pol2_0",0) ); // for background
fitter->AddModel("data2", new TGo4FitPolynom("Pol2_1",1) ); // for background
fitter->AddModel("data2", new TGo4FitGauss1("Gauss2_1",350.,2552.8,14.3) );
fitter->AddModel("data2", new TGo4FitGauss1("Gauss2_2",150.,2671.6,11.2) );
fitter->AddModel("data2", new TGo4FitGauss1("Gauss2_3",350.,2552.8,14.3) );
fitter->AddModel("data2", new TGo4FitGauss1("Gauss2_4",150.,2671.6,11.2) );

// specify initial values and dependencies between fit parameters:
TGo4FitterConfig* config = new TGo4FitterConfig("config","fitter configuration");
config->AddInitialization("Pol1_0.Ampl","20" );
config->AddInitialization("Pol1_1.Ampl","0" );
config->AddInitialization("Pol2_0.Ampl","430");
config->AddInitialization("Pol2_1.Ampl","0" );
config->AddDependence("Gauss2_1.Pos", "Gauss1_1.Pos" );
config->AddDependence("Gauss2_1.Width", "Gauss1_1.Width");
config->AddDependence("Gauss2_2.Pos", "Gauss1_2.Pos" );
config->AddDependence("Gauss2_2.Width", "Gauss1_2.Width");
fitter->SetConfig(config,kTRUE);
return fitter;
}
```

Use prebuilt fitter

```
void Example3() { // Fit two peaks in two histograms and two more in one of them
// create fitter and select method and minimizer:
  TGo4Fitter* fitter = BuildFitter(); // from last slide
  fitter->SetFCNType(TGo4Fitter::fcn_ML_Poisson); // maximum likelihood
// create minimizer:
  TGo4FitMinuit *fMinuit = new TGo4FitMinuit("Minuit","Minimization object");
  fMinuit->AddCommand("MIGRAD 500 1"); // Command for Minuit
  fitter->SetMinimizer(fMinuit);
// create object to fit (histogram):
  TH1D* histo1 = GetHistogram("hDeg120_P_c"); // get a histogram
  TH1D* histo2 = GetHistogram("hDeg120_CND"); // get a histogram
  fitter->SetObject(histo1, "data1");
  fitter->SetObject(histo2, "data2");
// Prepare fitter: fitter->Initialize();
// Optional optimization: fitter->CalculateAmplitudes(); // Fit:
  fitter->DoMinimization();
// Get the result as same type as data object (histogram):
  TH1* result1 = (TH1*) fitter->CreateResult("data1");
  TH1* result2 = (TH1*) fitter->CreateResult("data2");
// Close fit: fitter->Finalize();
// Draw data histogram and fit curve(s):
  DrawTwoHistograms("Example",histo1,result1);
  DrawTwoHistograms("Example",histo2,result2);
// print results
  fitter->Print();
  delete fitter;
}
```