HowTo Draw Confidence Regions

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1 Standard use

In order to draw contour lines representing 90% confidence regions for single EDW events one has to do the following steps:

1. Load the kqpa library.

```
gSystem->Load("$KDATA_ROOT/lib/libkqpa.so");
```

2. Make a KQContourPointList object.

```
KQContourPointList aList("QErecoil");
```

or

```
KQContourPointList aList("IonHeat");
```

3. Fill the list with points (Q, E_{Recoil}, $\sigma_{E_{ion}}$, $\sigma_{E_{heat}}$) or (E_{ion}, E_{heat} , $\sigma_{E_{ion}}$, $\sigma_{E_{heat}}$)

   (a) Read an ASCII file in the current working directory with lines of the form
   <Q> <E_{recoil}> <$\sigma_{E_{ion}}$> <$\sigma_{E_{heat}}$> for mode "QErecoil"
   <E_{ion}> <E_{heat}> <$\sigma_{E_{ion}}$> <$\sigma_{E_{heat}}$> for mode "IonHeat"

```
aList.ReadASCIIFile(aFileName);
```

   (b) Add events manually

```
aList.AddPoint(aQvalue,anEnergyRecoil,aSigmaIon,aSigmaHeat);
```

   for mode "QErecoil"

```
aList.AddPoint(anEnergyIon,anEnergyHeat,aSigmaIon,aSigmaHeat);
```

   for mode "IonHeat"

4. Draw the events in an empty frame

```
aList.Draw(anOption = "");
```

2 Additional features

The default values of the empty frame ($E_{recoil} = 0..1000keV$, $Q = 0..2$) can be changed with set methods

```
aList.SetQvalueMax(aNewQvalueMin);
aList.SetQvalueMin(aNewQvalueMin);
aList.SetEnergyRecoilMax(aNewEnergyRecoilMax);
aList.SetEnergyRecoilMin(aNewEnergyRecoilMin);
```

The list of points can be cleared by

```
aList.ClearPoints();
```

and single events can be removed by

```
aListRemovePoint(anIndex);
```

In order to find valid indices the size of the list can be retrieved by

```
UInt_t aSize = aList.GetEntries();
```

Also single events can be created and drawn:

```
KQContourPoint anEvent(aQvalue,
                       anEnergyRecoil,
                       "QERecoil",
                       aSigmaIon,
                       aSigmaHeat,
                       aSigmaIonHeat,
                       aConfidenceLevel,
                       aVoltageBias,
                       anEpsilon);
anEvent.Draw(anOption="");
```

or

```
KQContourPoint anEvent(anEnergyIon,
                       anEnergyHeat,
                       "IonHeat",
                       aSigmaIon,
                       aSigmaHeat,
                       aSigmaIonHeat,
                       aConfidenceLevel,
                       aVoltageBias,
                       anEpsilon);
anEvent.Draw(anOption="");
```

In case that there might be changes necessary on the empty frame or the contour function, they can directly be retrieved by

```
TF2* aFunction = aList.GetEmptyFrame();
TF2* aFunction = anEvent.GetFunction();
```