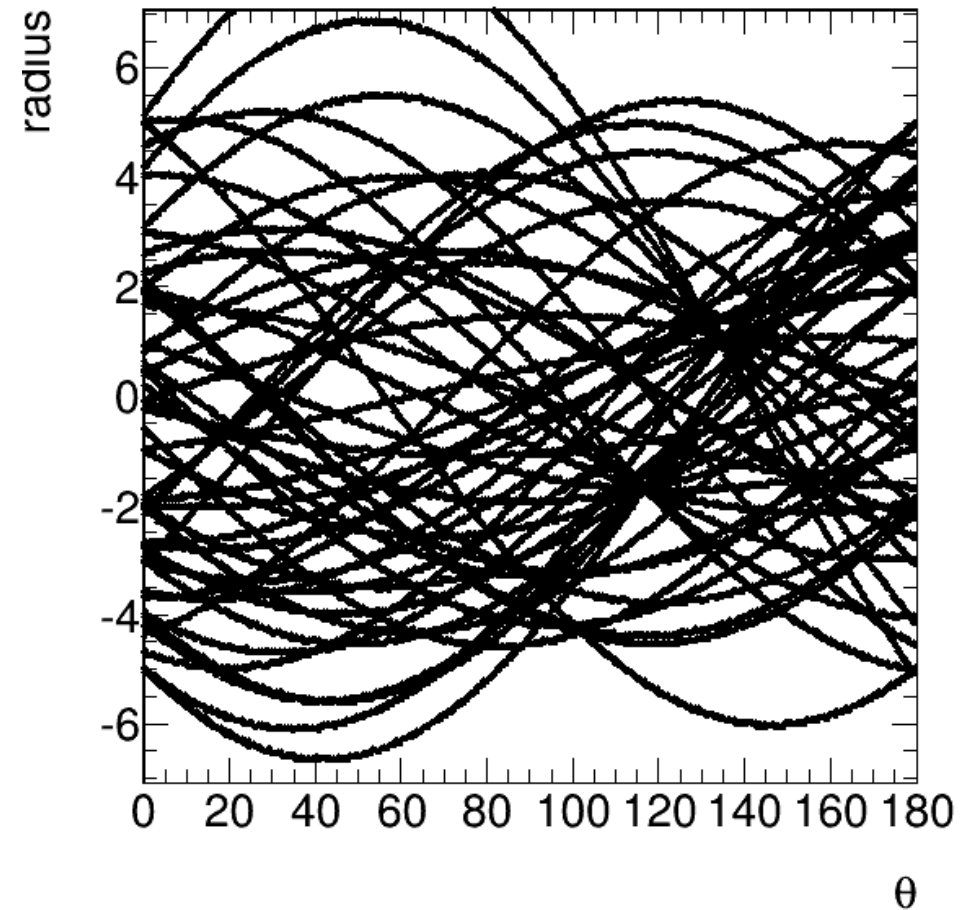
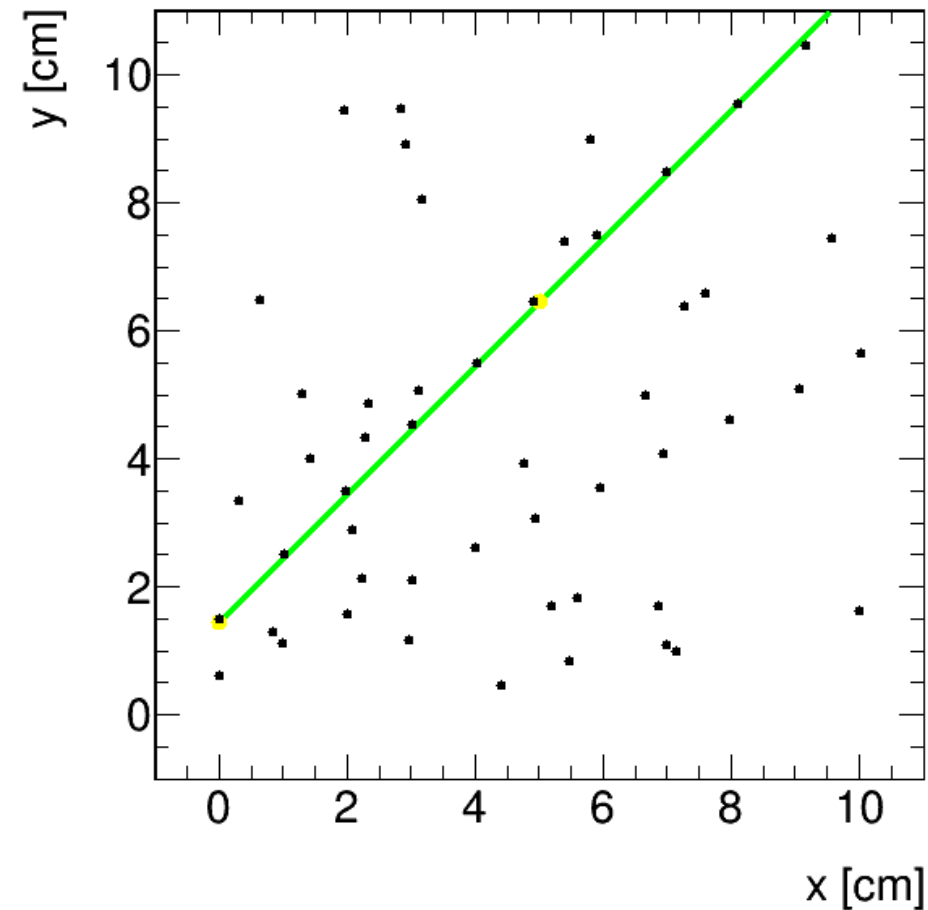


Simple Hough Transform Example

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Output plots: sim. hit distribution | parameter space



hough_transform.C macro output:

```
Simulating hits data...
```

n (~30) random hits, $nLines$ (=2) lines

```
Plotting  $y(x) = 1x + 1.5...$ 
```

```
Plotting  $y(x) = 0.5x + 0.6...$ 
```

```
Reading hits data...
```

$$r = x \cos(\theta) + y \sin(\theta)$$

```
Hough Transform...
```

$$0 < \theta < 180$$

First did a threshold check (threshold based on running the macro first), then searched for $nLines$ number of maxima.

```
Searching for maximum(s) in parameter space...
```

```
NEW local maxima w/ 4 intersect(s) @ (radius, theta) = -5.57107, 35.6  
SAME local maxima w/ 4 intersect(s) @ (radius, theta) = -5.22107, 66.4  
NEW local maxima w/ 6 intersect(s) @ (radius, theta) = -3.12107, 71.4  
SAME local maxima w/ 6 intersect(s) @ (radius, theta) = -3.02107, 69.4  
NEW local maxima w/ 7 intersect(s) @ (radius, theta) = -1.77107, 116.2  
SAME local maxima w/ 7 intersect(s) @ (radius, theta) = -1.77107, 116.4  
NEW local maxima w/ 9 intersect(s) @ (radius, theta) = -1.72107, 116.8  
SAME local maxima w/ 9 intersect(s) @ (radius, theta) = 1.02893, 135
```

```
Without ROOT, found global maxima @ radius, theta = -1.72107, 116.8
```

```
Without ROOT, found global maxima @ radius, theta = 1.02893, 135
```

hough_transform.C macro output:

```
Converting from polar back to cartesian coordinates...
```

$$y = \frac{r - x \cos(\theta)}{\sin(\theta)}$$

```
*****
```

```
Minimizer is Linear
```

```
Chi2          = 2.2803e-30
Ndf           = 1
p0            = 0.546136 +/- 1.3785e-15
p1            = 0.505136 +/- 2.13556e-16
```

```
Found y(x) = 0.505136x + 0.546136
```

```
*****
```

```
Minimizer is Linear
```

```
Chi2          = 0
Ndf           = 1
p0            = 1.45513 +/- 0.912871
p1            = 1 +/- 0.141421
```

```
Found y(x) = 1x + 1.45513
```

ROOT Fit to ("poll") to recover
y=mx+b

Output plots: sim. hit distribution | parameter space

