

# Experiment 6:- Photoconductivity

EP20B012-Chaganti Kamaraja Siddhartha

```
In[1]:= v = {0.0, 0.5, 1.0, 1.5, 2.0, 2.5, 3.0, 3.5, 4.0, 4.5,  
           5.0, 5.5, 6.0, 6.5, 7.0, 7.5, 8.0, 8.5, 9.0, 9.5, 10.0, 10.5, 11.0,  
           11.5, 12.0, 12.5, 13.0, 13.5, 14.0, 14.5, 15.0, 15.5, 16.0};  
c1 = {-0.0, -0.0, 0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07, 0.08,  
      0.09, 0.1, 0.11, 0.12, 0.13, 0.14, 0.15, 0.17, 0.18, 0.19, 0.2, 0.22,  
      0.23, 0.24, 0.25, 0.26, 0.27, 0.28, 0.29, 0.3, 0.31, 0.32, 0.33};  
c2 = {-0.0, -0.0, -0.0, 0.01, 0.02, 0.03, 0.03, 0.04, 0.05, 0.06,  
      0.06, 0.07, 0.08, 0.09, 0.1, 0.1, 0.11, 0.12, 0.13, 0.14, 0.14, 0.15,  
      0.16, 0.17, 0.18, 0.18, 0.19, 0.2, 0.2, 0.21, 0.22, 0.23, 0.24};  
c3 = {-0.0, -0.0, 0.01, 0.01, 0.02, 0.03, 0.04, 0.05, 0.06, 0.07,  
      0.08, 0.09, 0.1, 0.1, 0.11, 0.12, 0.13, 0.14, 0.15, 0.16, 0.17, 0.18,  
      0.19, 0.2, 0.2, 0.21, 0.22, 0.23, 0.24, 0.25, 0.26, 0.27, 0.28};
```

```
In[5]:= data1 = Transpose[{v, c1}];  
lm1 = LinearModelFit[data1, x, x]  
data2 = Transpose[{v, c2}];  
lm2 = LinearModelFit[data2, x, x]  
data3 = Transpose[{v, c3}];  
lm3 = LinearModelFit[data3, x, x]
```

```
Out[6]= FittedModel[
$$-0.0143672 + 0.0216444 x$$
]
```

```
Out[8]= FittedModel[
$$-0.0113191 + 0.0154679 x$$
]
```

```
Out[10]= FittedModel[
$$-0.0115865 + 0.0180013 x$$
]
```

```
In[11]:= Normal[lm3]
```

```
Out[11]= 
$$-0.0115865 + 0.0180013 x$$

```

```
In[12]:= (0.021644385026737985 + 0.015467914438502645 + 0.01800133689839572) / 3
```

```
Out[12]= 
$$0.0183712$$

```

```
In[13]:= Normal[lm2]
```

```
Out[13]= 
$$-0.0113191 + 0.0154679 x$$

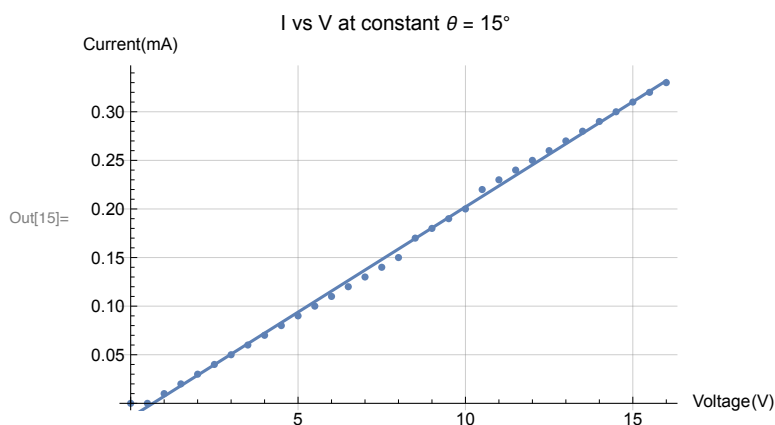
```

```
In[14]:= Normal[lm3]
```

```
Out[14]= 
$$-0.0115865 + 0.0180013 x$$

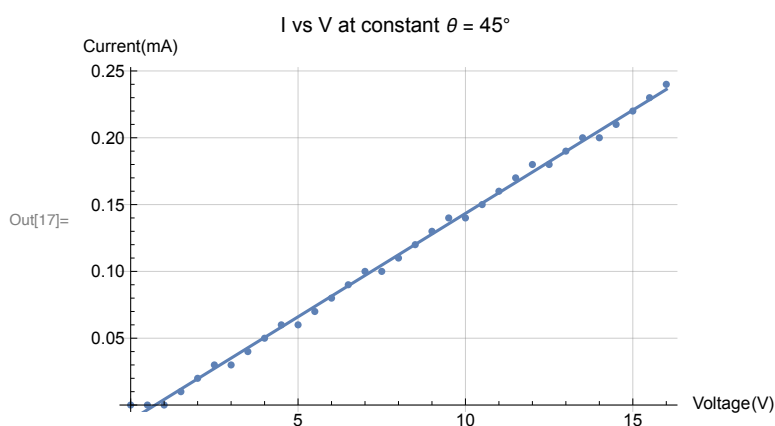
```

```
In[15]:= Show[ListPlot[data1, AxesLabel → {"Voltage(V)", "Current(mA)"}],
  Plot[lm1[x], {x, 0, 16}],
  PlotLabel → "I vs V at constant  $\theta = 15^\circ$ ", GridLines → Automatic]
```

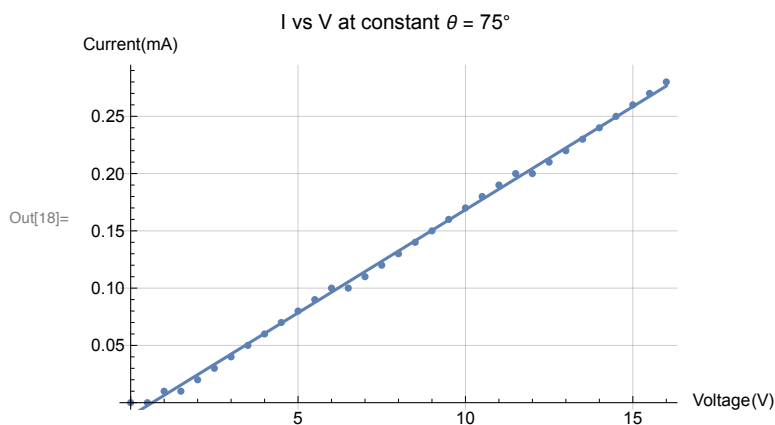


```
In[16]:=
```

```
In[17]:= Show[ListPlot[data2, AxesLabel → {"Voltage(V)", "Current(mA)"}],
  Plot[lm2[x], {x, 0, 16}],
  PlotLabel → "I vs V at constant  $\theta = 45^\circ$ ", GridLines → Automatic]
```



```
In[18]:= Show[ListPlot[data3, AxesLabel → {"Voltage(V)", "Current(mA)"}],
  Plot[lm3[x], {x, 0, 16}],
  PlotLabel → "I vs V at constant  $\theta = 75^\circ$ ", GridLines → Automatic]
```



```

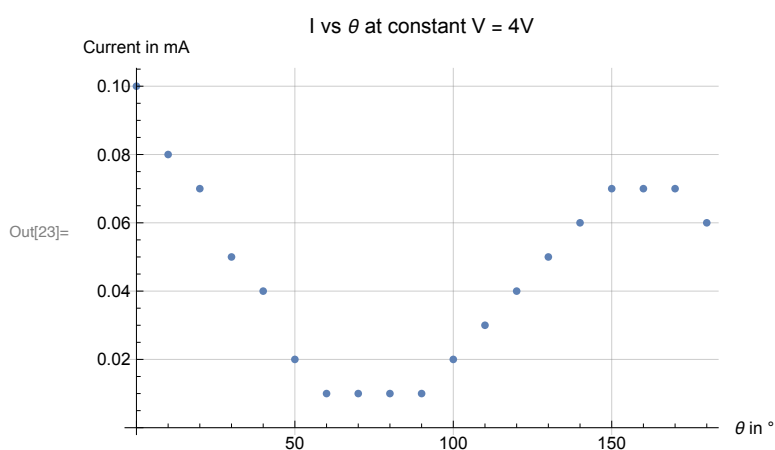
In[19]:=  $\theta = \text{Range}[0, 180, 10];$ 
c1 = {-0.1, -0.08, -0.07, -0.05, -0.04, -0.02, -0.01, -0.01, -0.01, -0.01,
      -0.02, -0.03, -0.04, -0.05, -0.06, -0.07, -0.07, -0.07, -0.06} (-1);
c2 = {-0.1, -0.08, -0.07, -0.05, -0.03, -0.02, -0.02, -0.02, -0.04, -0.05,
      -0.06, -0.08, -0.1, -0.11, -0.13, -0.15, -0.16, -0.15, -0.13} (-1);
c3 = {-0.16, -0.13, -0.11, -0.09, -0.09, -0.09, -0.08, -0.08, -0.11, -0.13,
      -0.17, -0.22, -0.26, -0.3, -0.35, -0.39, -0.4, -0.39, -0.36} (-1);

```

```

In[23]:= ListPlot[Transpose[{ $\theta$ , c1}], Joined  $\rightarrow$  False,
  AxesLabel  $\rightarrow$  {" $\theta$  in  $^\circ$ ", "Current in mA"},
  PlotLabel  $\rightarrow$  "I vs  $\theta$  at constant V = 4V", GridLines  $\rightarrow$  Automatic]

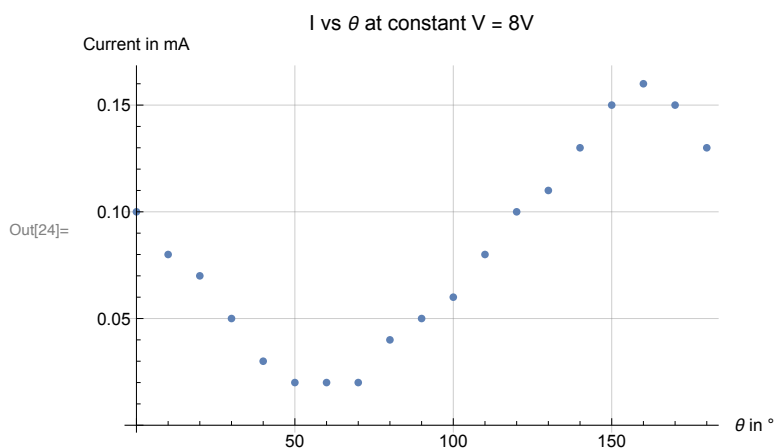
```



```

In[24]:= ListPlot[Transpose[{ $\theta$ , c2}], Joined  $\rightarrow$  False,
  AxesLabel  $\rightarrow$  {" $\theta$  in  $^\circ$ ", "Current in mA"},
  PlotLabel  $\rightarrow$  "I vs  $\theta$  at constant V = 8V", GridLines  $\rightarrow$  Automatic]

```



```
In[25]:= ListPlot[Transpose[{ $\theta$ , c3}], Joined  $\rightarrow$  False,  
  AxesLabel  $\rightarrow$  {" $\theta$  in  $^{\circ}$ ", "Current in mA"},  
  PlotLabel  $\rightarrow$  "I vs  $\theta$  at constant V = 12V", GridLines  $\rightarrow$  Automatic]
```

