

```
ln[ ]:= (*定义数据数组*) dataY = {-0.505, -0.214, -0.043, 0.636, 1.216};
dataX = {8.214 * 10^14, 7.408 * 10^14, 6.879 * 10^14, 5.490 * 10^14, 5.196 * 10^14};
```

(*线性回归拟合*)

```
fit = LinearModelFit[Transpose[{dataX, dataY}], x, x];
      |线性拟合模型 |转置
```

(*获取拟合方程和斜率*)

```
fitFunction = fit["BestFit"];
slope = fit["BestFitParameters"][[2];
```

(*计算 h*)

```
h = Abs[slope] * (1.602 * 10^-19);
    |绝对值
```

(*定义 h0*)

```
h0 = 6.626 * 10^-34;
```

(*计算 E*)

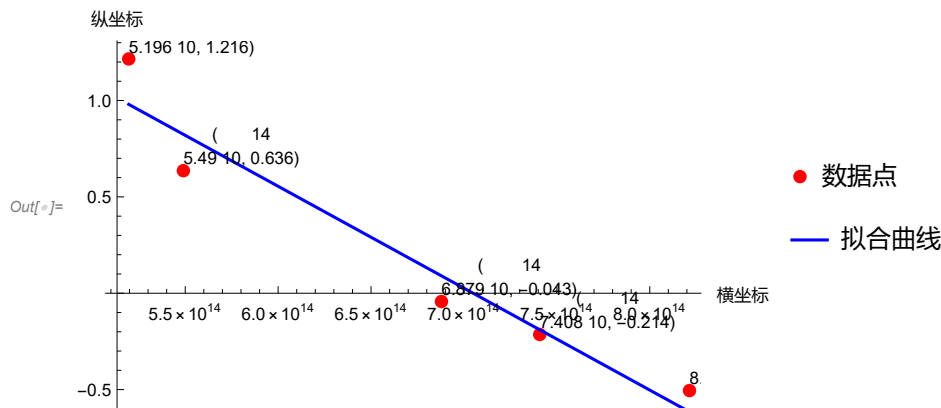
```
      |自然常数
E0 = (h - h0) / h0;
```

(*绘制数据点和拟合直线，并标出数据点的数值和拟合方程*)

```
Show[ListPlot[Transpose[{dataX, dataY}], PlotStyle -> {Red, PointSize[Large]},
|显示 |绘制点集 |转置 |绘图样式 |红色 |点的大小 |大
AxesLabel -> {"横坐标", "纵坐标"}, PlotLegends -> {"数据点"}],
|坐标轴标签 |绘图的图例
Plot[fitFunction, {x, Min[dataX], Max[dataX]}, PlotStyle -> Blue,
|绘图 |最小值 |最大值 |绘图样式 |蓝色
PlotLabel -> "一次线性拟合曲线", PlotLegends -> {"拟合曲线"}],
|绘图标签 |绘图的图例
Epilog -> {Text["(" <> ToString[dataX[[1]]] <> ", " <> ToString[dataY[[1]]] <> ")"],
|绘制主… |文本 |转换为字符串 |转换为字符串
{dataX[[1], dataY[[1]]}, {-1, -1}], Text["(" <> ToString[dataX[[2]]] <>
|文本 |转换为字符串
", " <> ToString[dataY[[2]]] <> ")"], {dataX[[2], dataY[[2]]}, {-1, -1}],
|转换为字符串
Text["(" <> ToString[dataX[[3]]] <> ", " <> ToString[dataY[[3]]] <> ")"],
|文本 |转换为字符串 |转换为字符串
{dataX[[3], dataY[[3]]}, {-1, -1}], Text["(" <> ToString[dataX[[4]]] <>
|文本 |转换为字符串
", " <> ToString[dataY[[4]]] <> ")"], {dataX[[4], dataY[[4]]}, {-1, -1}],
|转换为字符串
Text["(" <> ToString[dataX[[5]]] <> ", " <> ToString[dataY[[5]]] <> ")"],
|文本 |转换为字符串 |转换为字符串
{dataX[[5], dataY[[5]]}, {-1, -1}], Text["拟合直线: y = " <>
|文本
ToString[Normal[fitFunction], InputForm], {0, 8 * 10^14}, {0, 1}]]]
|转换为… |转换为普通表达式 |输入格式
```

(*计算误差分析*)

```
Print["拟合方程: ", fitFunction];
Print["拟合参数: ", fit["ParameterTable"]];
Print["决定系数R²: ", fit["RSquared"]];
Print["标准误差: ", fit["EstimatedVariance"]];
Print["计算得出的斜率: ", slope];
Print["h: ", h];
Print["E0: ", E0];
```



拟合方程: $3.72769 - 5.28775 \times 10^{-15} x$

拟合参数:		Estimate	Standard Error	t-Statistic	P-Value
1		3.72769	0.531052	7.01945	0.00593893
x		-5.28775×10^{-15}	7.88485×10^{-16}	-6.70621	0.00676585

决定系数R²: 0.937465

标准误差: 0.0406101

计算得出的斜率: -5.28775×10^{-15}

h: 8.47097×10^{-34}

E0: 0.278444

```
In[ ]:= (*定义数据数组*) dataY = {-1.968, -1.621, -1.412, -0.856, -0.753};
dataX = {8.214 * 10^14, 7.408 * 10^14, 6.879 * 10^14, 5.490 * 10^14, 5.196 * 10^14};
```

(*线性回归拟合*)

```
fit = LinearModelFit[Transpose[{dataX, dataY}], x, x];
```

(*获取拟合方程和斜率*)

```
fitFunction = fit["BestFit"];
slope = fit["BestFitParameters"][[2];
```

(*计算 h*)

```
h = Abs[slope] * (1.602 * 10^-19);
```

|绝对值

(*定义 h0*)

```
h0 = 6.626 * 10^-34;
```

(*计算 E*)

|自然常数

```
E0 = (h - h0) / h0;
```

(*绘制数据点和拟合直线，并标出数据点的数值和拟合方程*)

```
Show[ListPlot[Transpose[{dataX, dataY}], PlotStyle -> {Red, PointSize[Large]},
```

|显示 |绘制点集 |转置 |绘图样式 |红色 |点的大小 |大

```
  AxesLabel -> {"横坐标", "纵坐标"}, PlotLegends -> {"数据点"}],
```

|坐标轴标签 |绘图的图例

```
  Plot[fitFunction, {x, Min[dataX], Max[dataX]}, PlotStyle -> Blue,
```

|绘图 |最小值 |最大值 |绘图样式 |蓝色

```
  PlotLabel -> "一次线性拟合曲线", PlotLegends -> {"拟合曲线"}],
```

|绘图标签 |绘图的图例

```
  Epilog -> {Text["(" <> ToString[dataX[[1]]] <> ", " <> ToString[dataY[[1]]] <> ")"],
```

|绘制主… |文本 |转换为字符串 |转换为字符串

```
    {dataX[[1], dataY[[1]]}, {-1, -1}], Text["(" <> ToString[dataX[[2]]] <>
```

|文本 |转换为字符串

```
    ", " <> ToString[dataY[[2]]] <> ")"], {dataX[[2], dataY[[2]]}, {-1, -1}],
```

|转换为字符串

```
    Text["(" <> ToString[dataX[[3]]] <> ", " <> ToString[dataY[[3]]] <> ")"],
```

|文本 |转换为字符串 |转换为字符串

```
    {dataX[[3], dataY[[3]]}, {-1, -1}], Text["(" <> ToString[dataX[[4]]] <>
```

|文本 |转换为字符串

```
    ", " <> ToString[dataY[[4]]] <> ")"], {dataX[[4], dataY[[4]]}, {-1, -1}],
```

|转换为字符串

```
    Text["(" <> ToString[dataX[[5]]] <> ", " <> ToString[dataY[[5]]] <> ")"],
```

|文本 |转换为字符串 |转换为字符串

```
    {dataX[[5], dataY[[5]]}, {-1, -1}], Text["拟合直线: y = " <>
```

|文本

```
    ToString[Normal[fitFunction], InputForm], {0, 8 * 10^14}, {0, 1}]]]
```

|转换为… |转换为普通表达式 |输入格式

(*计算误差分析*)

```
Print["拟合方程: ", fitFunction];
```

|打印

```
Print["拟合参数: ", fit["ParameterTable"]];
```

|打印

```
Print["决定系数R²: ", fit["RSquared"]];
```

|打印

```
Print["标准误差: ", fit["EstimatedVariance"]];
```

|打印

```
Print["计算得出的斜率: ", slope];
```

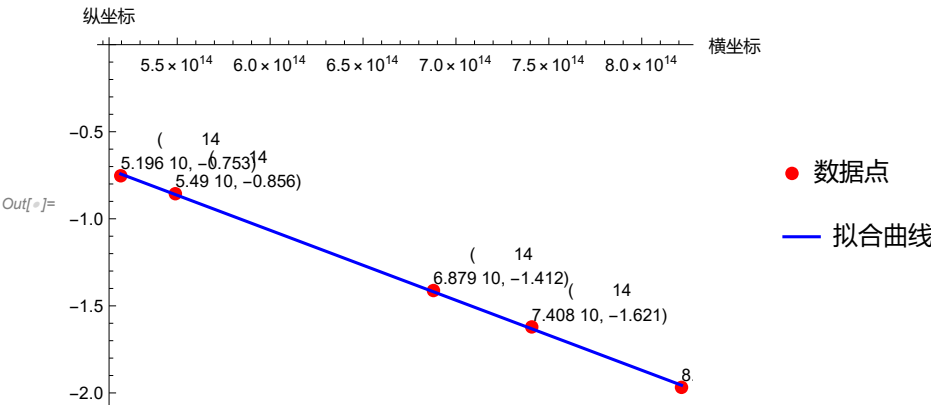
|打印

```
Print["h: ", h];
```

|打印

Print["E0: ", E0];

打印



拟合方程: $1.34584 - 4.0194 \times 10^{-15} x$

		Estimate	Standard Error	t-Statistic	P-Value
拟合参数:	1	1.34584	0.0321861	41.8143	0.0000301026
	x	-4.0194×10^{-15}	4.77886×10^{-17}	-84.1079	3.70458×10^{-6}

决定系数R²: 0.999576

标准误差: 0.000149175

计算得出的斜率: -4.0194×10^{-15}

h: 6.43908×10^{-34}

E0: -0.02821

```

In[ ]:= (*定义数据数组*)
UAK = {-4.97, -3.12, 1.40, 1.72, 2.73, 3.35, 3.68, 4.27, 4.53, 5.49, 6.17, 7.7, 9.78,
        11.00, 12.52, 15.76, 16.93, 19.8, 21.13, 23.87, 25.27, 26.97, 29.56, 30.40};
I0 = {0.00 * 10^-10, 0.00 * 10^-10, 2 * 10^-10, 3 * 10^-10, 9 * 10^-10, 13 * 10^-10,
        15 * 10^-10, 19 * 10^-10, 20 * 10^-10, 29 * 10^-10, 33 * 10^-10, 40 * 10^-10,
        49 * 10^-10, 54 * 10^-10, 60 * 10^-10, 70 * 10^-10, 73 * 10^-10, 79 * 10^-10,
        82 * 10^-10, 87 * 10^-10, 90 * 10^-10, 92 * 10^-10, 97 * 10^-10, 98 * 10^-10};

(*去除一个零值数据点*)
I0NonZero = I0;
UAKNonZero = UAK;
I0NonZero[[2]] = Missing[];
UAKNonZero[[2]] = Missing[];

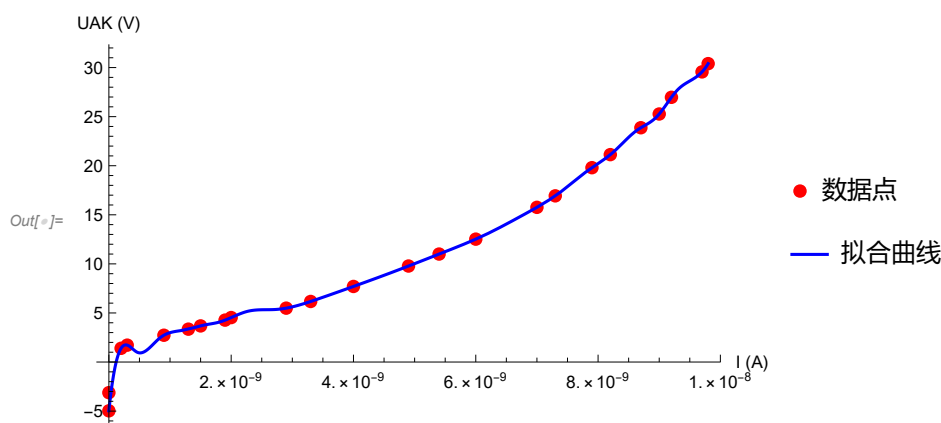
I0NonZero = DeleteMissing[I0NonZero];
UAKNonZero = DeleteMissing[UAKNonZero];

(*样条拟合*)
splineFit = Interpolation[Transpose[{I0NonZero, UAKNonZero}], Method -> "Spline"];

(*绘制数据点和样条拟合曲线, 并显示所有数据点*)
plot = Show[ListPlot[Transpose[{I0, UAK}], PlotStyle -> {Red, PointSize[Large]},
               AxesLabel -> {"I (A)", "UAK (V)"}, PlotLegends -> {"数据点"},
               Plot[splineFit[x], {x, Min[I0], Max[I0]}, PlotStyle -> Blue,
               PlotLabel -> "样条拟合曲线", PlotLegends -> {"拟合曲线"}]];

(*显示图像*)
plot

```



```
In[ ]:= (*定义数据数组*) phi = {2, 4, 8};
      I0 = {27, 98, 372} * 10^10;
```

(*样条拟合*)

```
splineFit = Interpolation[Transpose[{I0, phi}], Method -> "Spline"];
```

[内插] [转置] [方法]

(*绘制数据点和样条拟合曲线*)

```
plot = Show[
  ListPlot[Transpose[{I0, phi}], PlotStyle -> {Red, PointSize[Large]}, AxesLabel -> {"
    I0 (A)", "\[Phi] (mm)"}, PlotLegends -> {"数据点"}],
  Plot[splineFit[x], {x, Min[I0], Max[I0]}, PlotStyle -> Blue,
    PlotLabel -> "样条拟合曲线", PlotLegends -> {"拟合曲线"}];
```

[绘制点集] [转置] [绘图样式] [红色] [点的大小] [大] [坐标轴标签]

[绘图的图例]

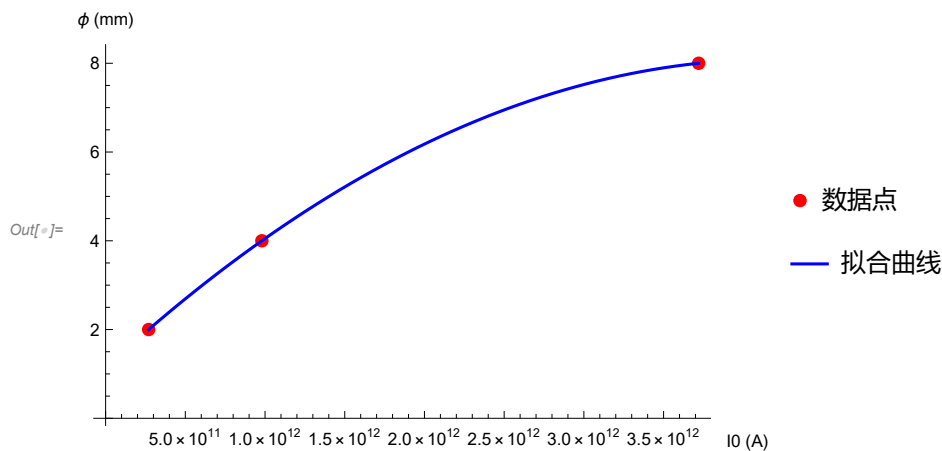
[绘图] [最小值] [最大值] [绘图样式] [蓝色]

[绘图标签] [绘图的图例]

(*显示图像*)

plot

Interpolation: 要求的阶数太高; 阶数已经被降低为 {2}.



```
In[ ]:= (*定义数据数组*) L = {300, 350, 400};
I0 = {96, 67, 44} * 10^10;
```

(*样条拟合*)

```
splineFit = Interpolation[Transpose[{I0, L}], Method -> "Spline"];
```

[内插] [转置] [方法]

(*绘制数据点和样条拟合曲线*)

```
plot = Show[ListPlot[Transpose[{I0, L}], PlotStyle -> {Red, PointSize[Large]}],
[显示] [绘制点集] [转置] [绘图样式] [红色] [点的大小] [大]
AxesLabel -> {"I0 (A)", "L (mm)"}, PlotLegends -> {"数据点"}],
[坐标轴标签] [绘图的图例]
Plot[splineFit[x], {x, Min[I0], Max[I0]}, PlotStyle -> Blue,
[绘图] [最小值] [最大值] [绘图样式] [蓝色]
PlotLabel -> "样条拟合曲线", PlotLegends -> {"拟合曲线"}]]];
[绘图标签] [绘图的图例]
```

(*显示图像*)

plot

Interpolation: 要求的阶数太高; 阶数已经被降低为 {2}.

