弗兰克赫兹实验电流极小值的讨论

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Outline

- 数据处理
- 模型假定
- 理论结果
- 数据支持

Parameters

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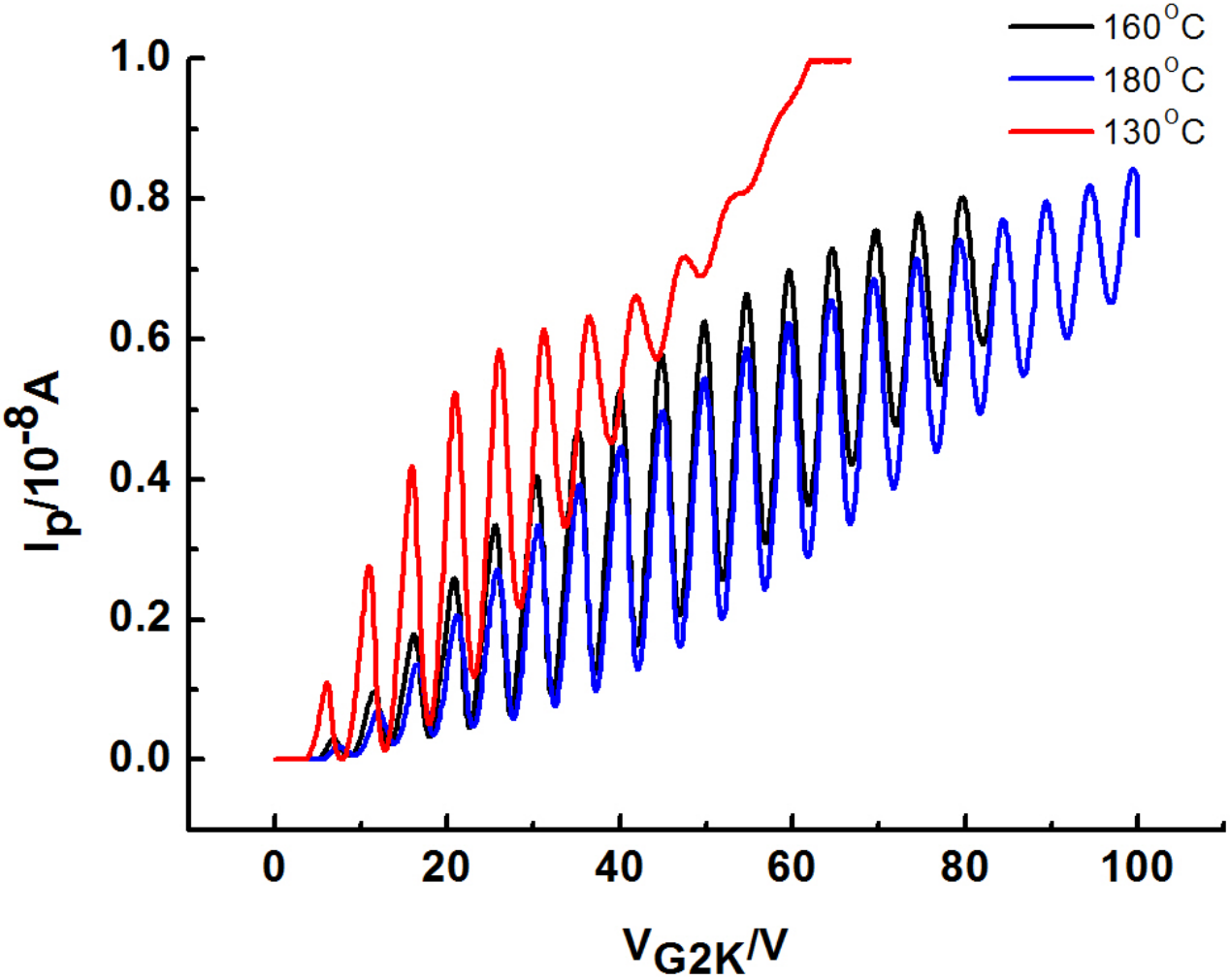
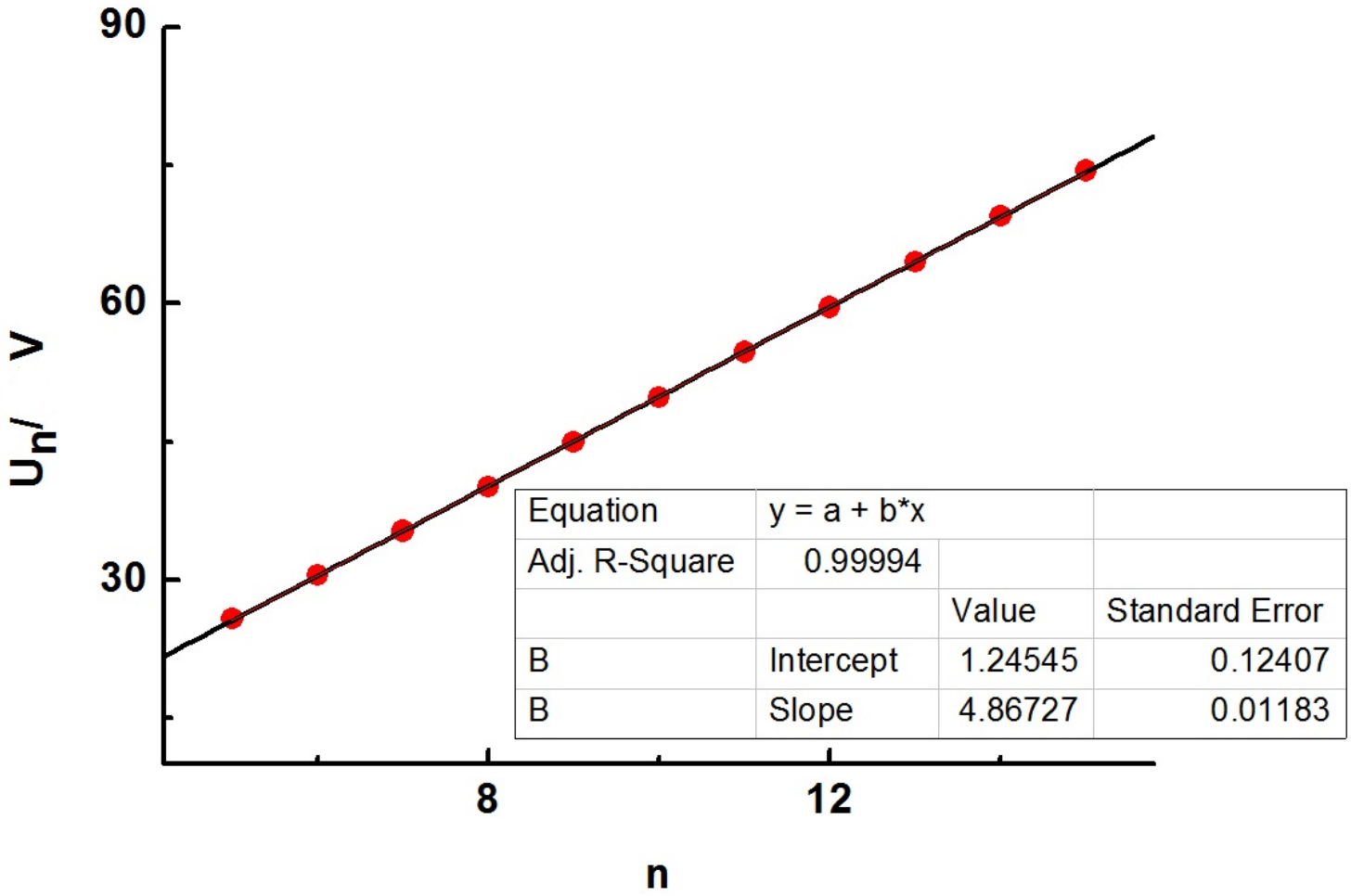
Background

汞原子电离贡献本底电流

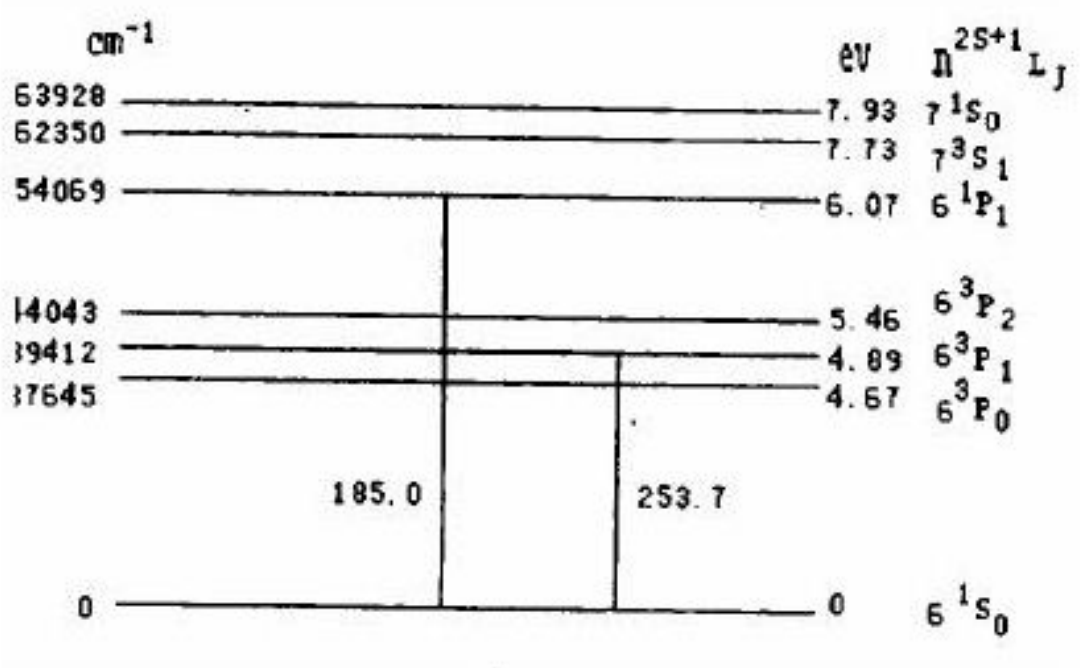


Data

$180°C$的$I_p - V_{G2_k}$曲线对峰位U_n和序号n直线拟合。



Not the Lowest One



6^3P_1能级激发电位4.89eV
6^3P_0能级激发电位4.67eV

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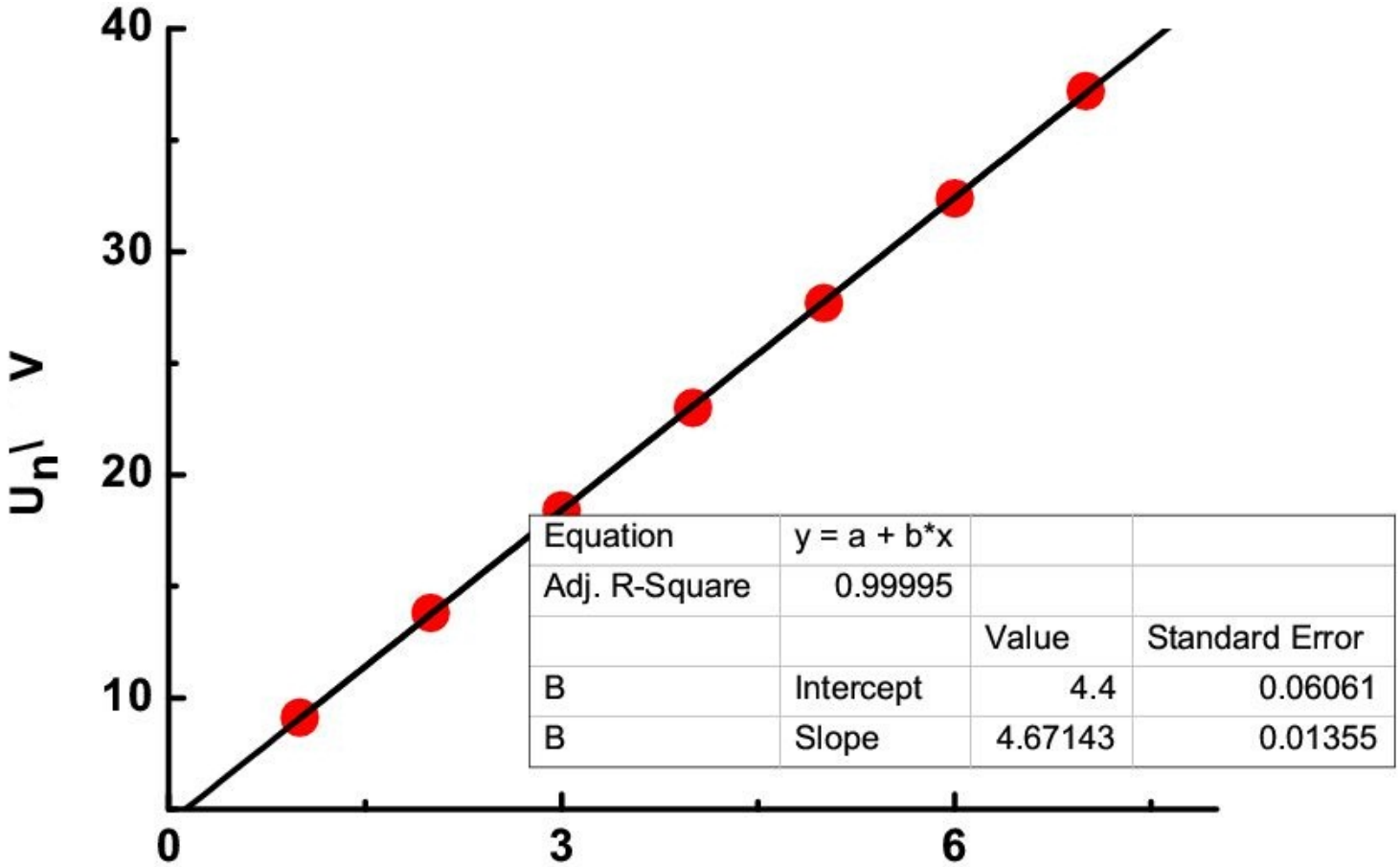

Equation	y = a + b*x		
Adj. R-Square	0.99995		
		Value	Standard Error
B	Intercept	4.4	0.06061
B	Slope	4.67143	0.01355

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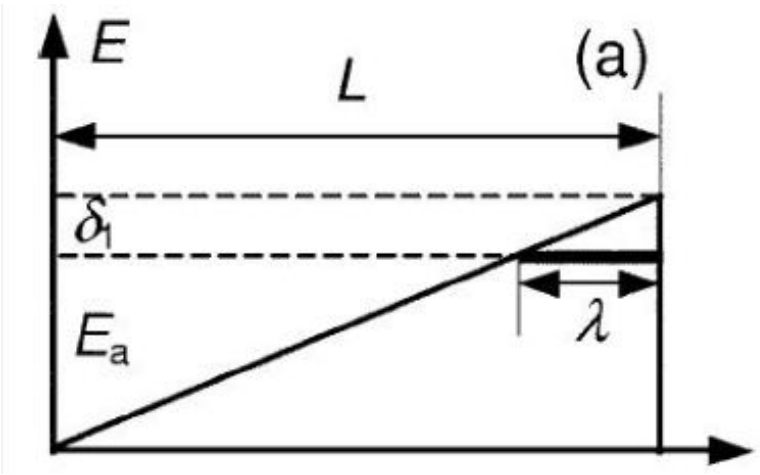
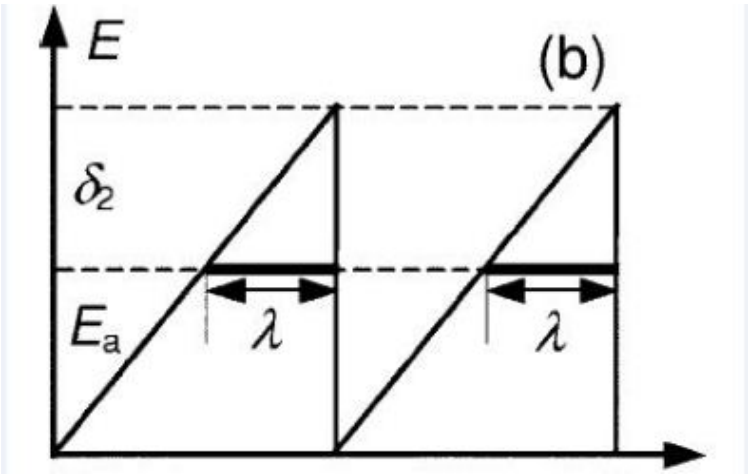
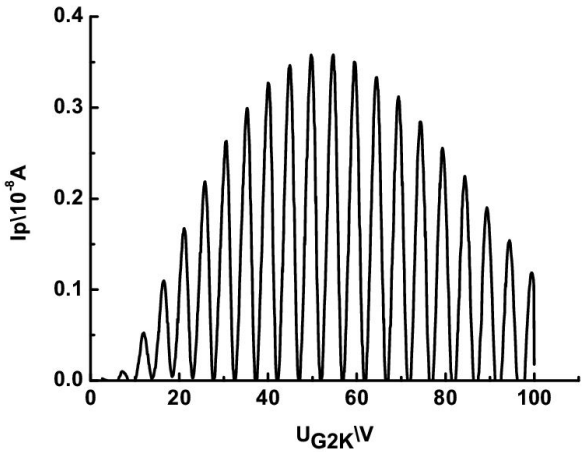


(a) 模型



(b) 模型



(c) 去本底后曲线

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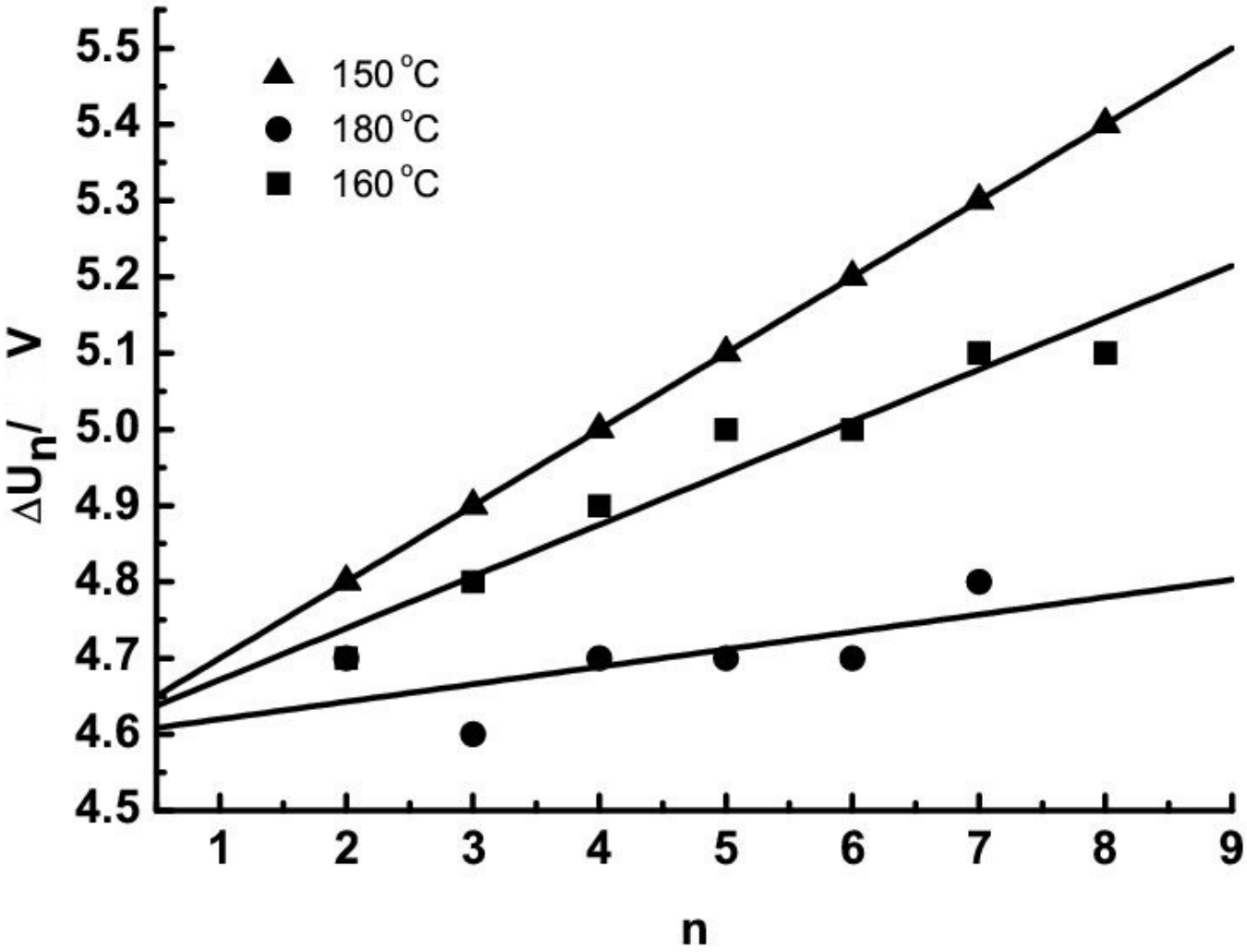
- $\Delta E(0.5) \equiv E_a$

Data Support



Mean Free Path

$$\lambda = \frac{L}{2E_a}\frac{\mathrm{d}\Delta E(n)}{\mathrm{d}n} \tag{7}$$

$$\lambda_{ela} \neq \lambda_{inela} \tag{8}$$

$T/°C$	150	160	180
$\frac{L}{2E_a}\frac{\mathrm{d}\Delta E(n)}{\mathrm{d}n}/mm$	0.05	0.04	0.02
λ/mm	0.09	0.05	0.03

需要更多的电压有效数字

Conclusions

- 根据电流极大值位置可以测量6^3P_1能级的激发电位
- 根据电流极小值位置可以测量6^3P_0能级的激发电位
- 电流极小值位置可以确定激发平均自由程

Great Thanks

- 白翠琴老师的指导和解答
- 徐迪飞同学的帮助

Question Time

Thank you for your attention