电子科技大学
格拉斯哥学院
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Physics Experiment 04

Prelab Report

Experiment Title:	Measurement of the Young's Modulus of Wire by Elongating
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Date Performed:	2018.06.23
Final Mark:	

Score

Answers to Questions (20 points)

（1）Its instrument error is 0.02 mm, since the smallest division is 0.02mm. And its reading error is 0.00 mm.

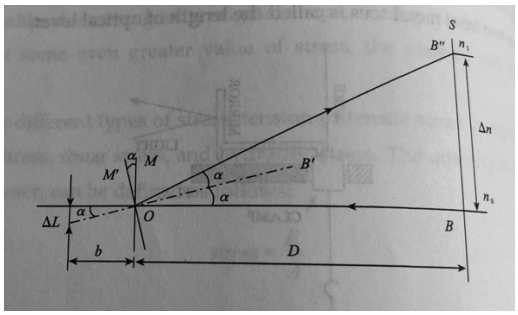
（2）The Young's modules is a quantity used to characterize materials, and also an inherent material property, which describe the ratio of stress to strain for a material experiencing either tensile or compressive stress in elastic deformation.

The original length of the steel wire, the diameter of the steel string, the distance between optical lever and telescope, and the distance between optical lever and toe will be measured.

In my opinion, the diameter of the steel string is the most critical quantity, since it is a quadratic value in the Young's modules equation, which means its change can cause bigger effect to the Young's modules equation.

（3）The main function of an optical lever in this experiment is to amplify the small displacement——the elongation of the wire， which is too small to measure, so that it can be measured.

The magnification can be calculated by analyzing the figure.3.4-3.



Since, $\tan\alpha \cong \alpha \cong \frac{\Delta L}{b}$, $\tan 2\alpha \cong 2\alpha \cong \frac{\Delta n}{D}$, and $\frac{\Delta L}{b} = \frac{\Delta n}{2D}$

Thus, $\frac{\Delta n}{\Delta L} = \frac{2D}{b}$