



电子科技大学
格拉斯哥学院
Glasgow College, UESTC

Physical Experiments I

Pre-lab Assignment

Experiment Title

Newton's rings

Your Chinese Name 郑长刚
(Your UESTC Student Number 2016200302027)

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Date Performed:

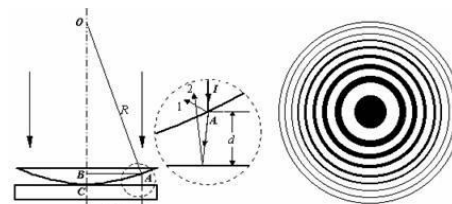
Score

Answers to Questions (20 points)

1. Why are Newton's rings circular?

Newton's rings occur due to the thin film interference principle, when a branch of monochromatic light shines on a lens. This lens is placed above and in contact with a glass plate. The occurrence of interference stripe depends on the thick air layer (small

distance) between the lens and the bottom surface. As we can see, the thickness of the air film is constant in the shape of a circle, so according to the film interference principle, the newton's rings are in a circular form.



2. In modern physics, light has been demonstrated to have wave-particle duality. Which nature is demonstrated in Newton's rings experiment?

As we know from this experiment, the expect experiment result is to see some light-shade alternate concentric rings, which is the typical phenomena of the utility of optics interference principle. It proves that the fluctuation of light is of the light's properties.

3. Why are the dark and bright fringes observed in Newton's rings?

Because after the light penetrates the glass plate, it will have refringence as it goes through the two interfaces of the glass. There will have two waves with have different intensity which combine and shine on the same point. The combining intensity of the wave would be different according to the light superposition principle. Because of the specific experiment equipment, these points are in order and could be observed by us

(maximum intensity happens at the point that two branch of light have all have the high amplitude and whereas is opposite.)

4.The sodium lamp in this experiment has two yellow components.

Why can it be used as the light source for the experiment?

We know that the wavelength range of the visible light source is between 400 and 760 nm, and this kind of light belongs to the composite light, which can be used directly for this experiment which has equal thickness. The color stripes from Sodium light in this experiment which is observed by us has the wavelength of about 588.9950nm and 589.5924nm respectively, this kind of light also belongs to the monochromatic light. So, it can be used as light source to observe this interference fringes at all levels.