Physics

Wednesday, February 21, 2024 1:32 PM

1. Photoelectric effect:
- Energy distribution of electrons does not depend on intensity of light.
- Minimal time lag
- E=L/r^2=CI ; where C is a constant
- Halogen tungsten lamp (12V/35W)
- Max Voltage difference b/w cathode and anode = +-15V
- Red filter - 635nm
- Part-I distance = 25cm
- Part-II = 40 - 20 cm

2. Frank-Hertz experiment:
- 1914, James Frank, Gustav Hertz
- Anode at slightly negative potential relative to mesh grid but positive w.r.t cathode
- Collisions between electrons and atoms are elastic
- Collisions between electrons and electrons are inelastic and are the reason for the excitation of electrons
- VG1K - 1.3-5 V, VG2K - 0-95V, VG2A - 1.3-12V
- For experiment , VG1K = 1.5V, VG2A = 7.5V, VG2K - 0V
- Grid helps to minimize space charge effects

3. Newton's Ring:
- Interference of light by amplitude division
- 45 degree for maximum illumination

4. Fresnel's Biprism:
- Two prisms with small angles like 0.5-1 degree

$$S_1P = D\left\{1+\frac{1}{2}\left(\frac{{}^{d}/_{2}+X_n}{D}\right)^2\right\}$$

and

$$S_2P = D\left\{1+\frac{1}{2}\left(\frac{{}^{d}/_{2}-X_n}{D}\right)^2\right\}$$

- where, $OP = X_n$ and assuming $\left({}^{d}/_{2} \pm X_n\right) \ll D$.

Thus, the path difference is

$$S_2P \sim S_1P = \frac{d}{D}X_n$$

Now if X_n happens to be the position of the nth fringe, then ,

$$\frac{d}{D}X_n = n\lambda$$

- Biprism at 10 cm from slit
- Eyepiece about 1 meter
- Biprism to be moved in opposite direction as that of fringe shift to remove lateral shift
- D1 - magnified, d2 - diminished for eyepiece at a distance greater than 4f
- biprism. The biprism holder has a circular aperture. The holder can rotate the biprism in its own plane about the horizontal axis and can be locked. A finer adjustment is possible with a tangent screw in a locked position. The third upright is used for the lens holder which carries a convex

5. Kundt's Tube:
- 59mm diameter and 1m length
- Sound wave is longitudinal and compression wave
- Transverse wave not possible in fluids as perpendicular interlinking component is missing.

6. Ultrasonic Diffraction:
- Ultrasonic waves generated by the piezoelectric crystal travels to the bottom of the tank and get reflected - interfere
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Order n	Distance from the central spot to n^{th} order spot D (m)	Angle of ultrasonic diffraction $\theta = tan^{-1}(D/L)$	$\Lambda = n\lambda/Sin\,\theta$ (m)	$V = \nu\Lambda$ (m/s)

standing wave. This standing wave formation creates a variation in density and refractive index of the liquid. And when the laser light is passed through this liquid, the

3D printing aka additive manufacturing
CAD - Computer Aided Designing
Material is deposited, joined or solidified
FDM - fused deposition modelling - extruding thermoplastic filaments such as ABS (Acrylonitrile Butadiene Styrene) or PLA (Polylactic Acid) layer by layer.
STL - Standard Tesselation Language
Printer - Ultimaker S5
Align such that least amount of overhangs
Material - PLA, Nozzle - AA 0.4mm
AA core used for fabrication
Layer Height - thickness of material being deposited
Generate Support - creates support for overhanging geometries - can be easily removed once the printing is done, Generally recommended to print with least amount of support
Build Plate Adhesion - extra layers around the base to help stick the print to the bed
Computer's estimated time is correct
Infill - how solid the object will be, Default - 20%
No tangles in the filament, Unwind smoothly
Apply fevistick on the surface in case of ABS. NO FEVICOL

> **11.** Once your print is complete then, tape on "Green Tick Mark" which instruct to machine for safe removal of 3D print. You need to carefully remove 3D print from glass plate using a spatula. Please follow all safety instructions while doing so. Do not try to remove the 3D print inside the 3D printer.

High temperatures
Allow to cool for five minutes
Never reach inside while operating
Control with touchscreen and power switch
Unplug the printer before doing maintenance
Keep hands out
Risk of burns
Use a deburring tool to remove the print. Take the build plate out of the machine
Wear gloves while removing the support
PVA support can be removed by dissolving in water
Tree support around the model
Normal directly below the model
Tree is better as it helps to reduce printing time and cause less scars to the model
PVA - Polyvinyl Alcohol