



Mystery Materials: a diffraction problem

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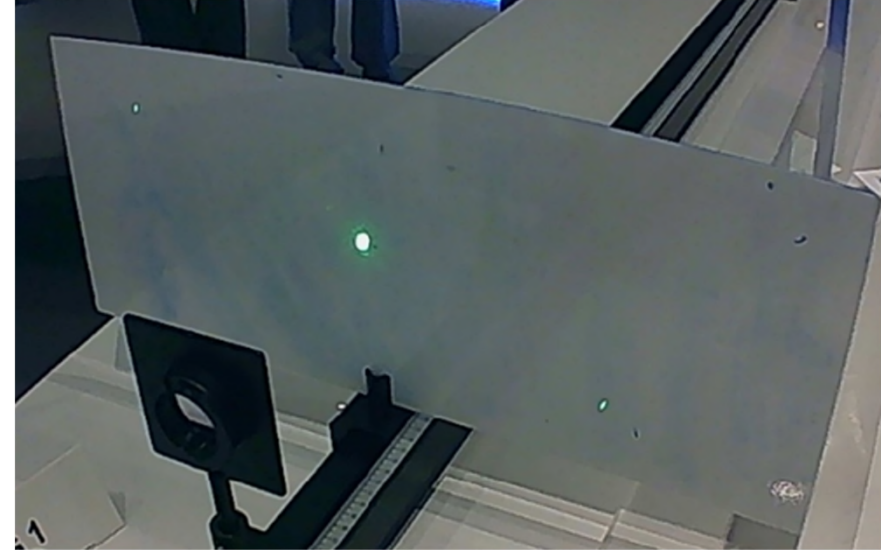
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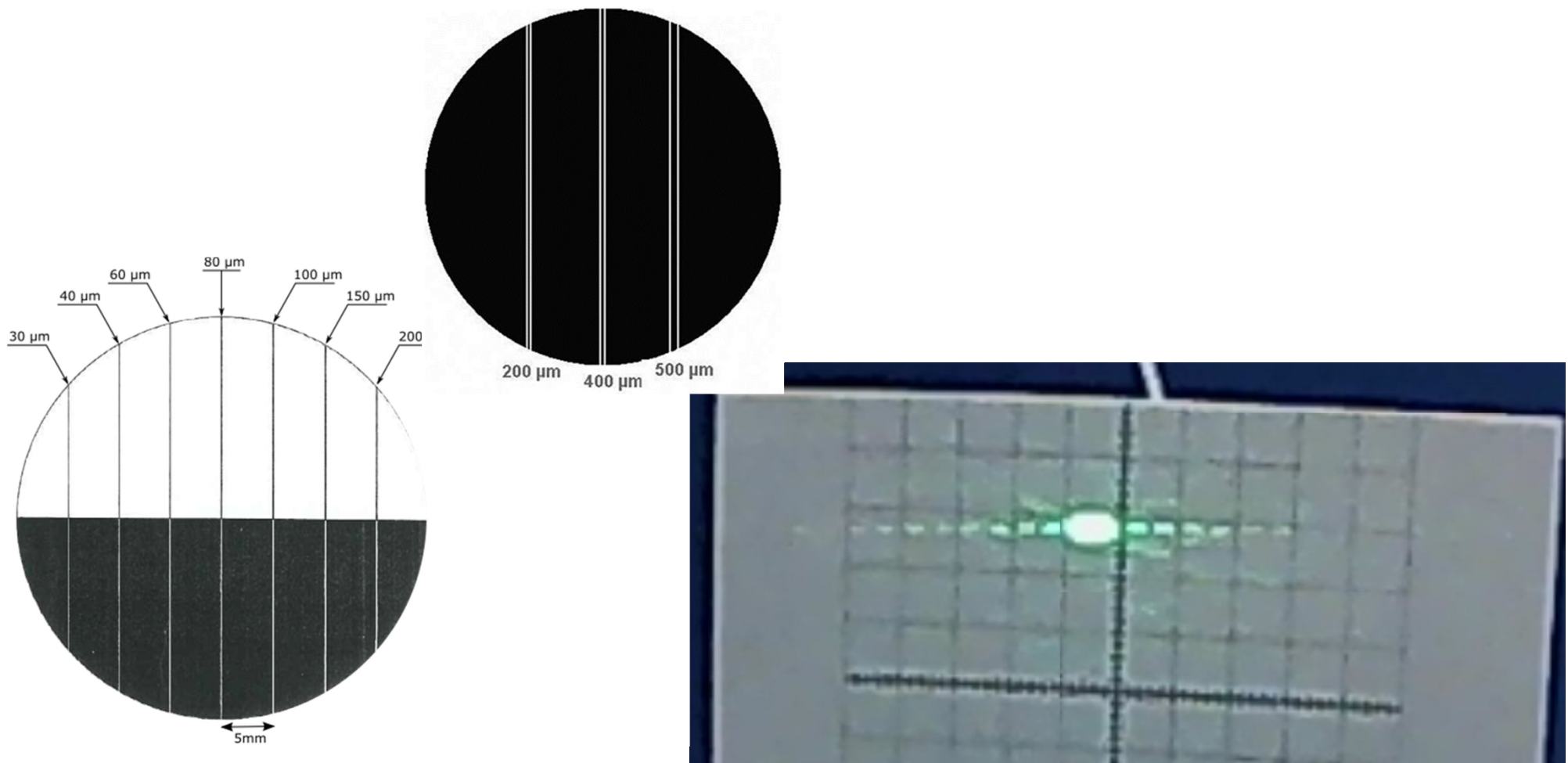
INTRODUCTION

- Investigator Sony Jr has a problem
- Identify a mystery material
- Diffraction patterns
- $\lambda = d \sin \theta$



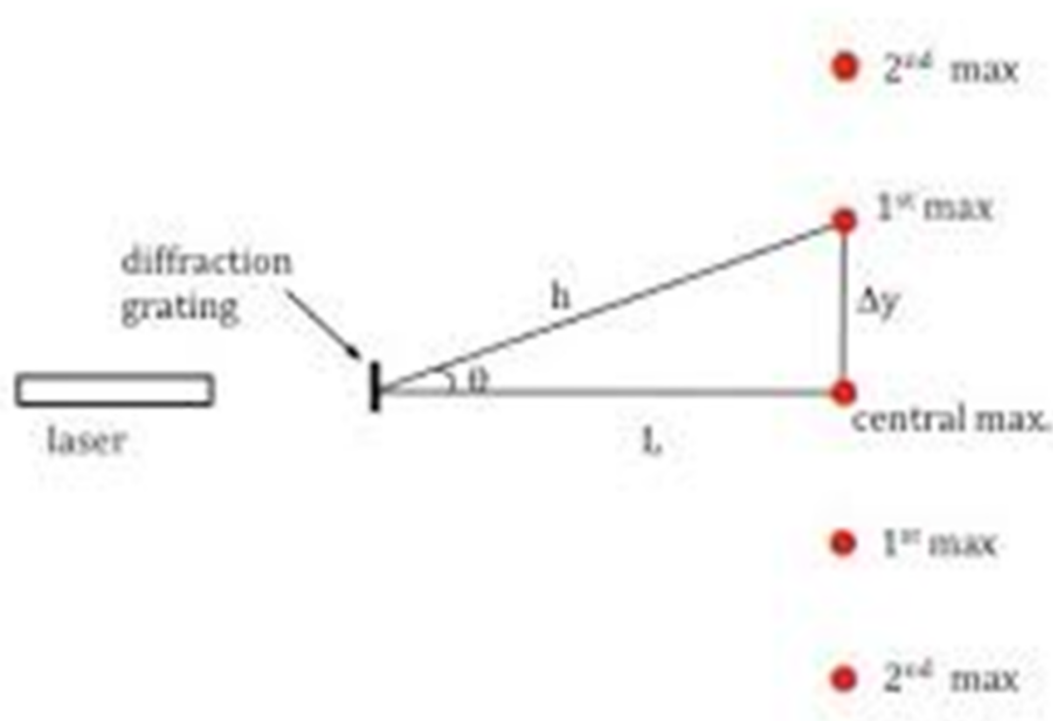
METHOD

1. Observing diffraction patterns
2. Mystery storage diffraction
3. Measure distance between maxima

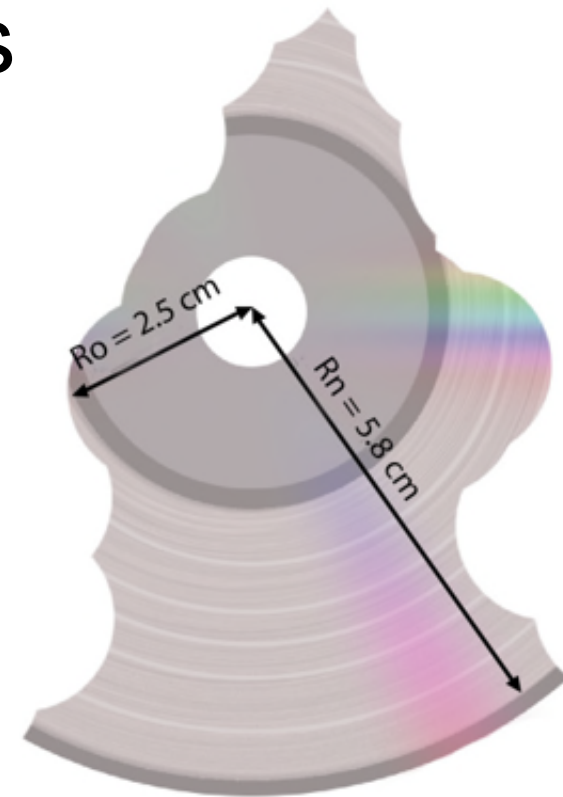
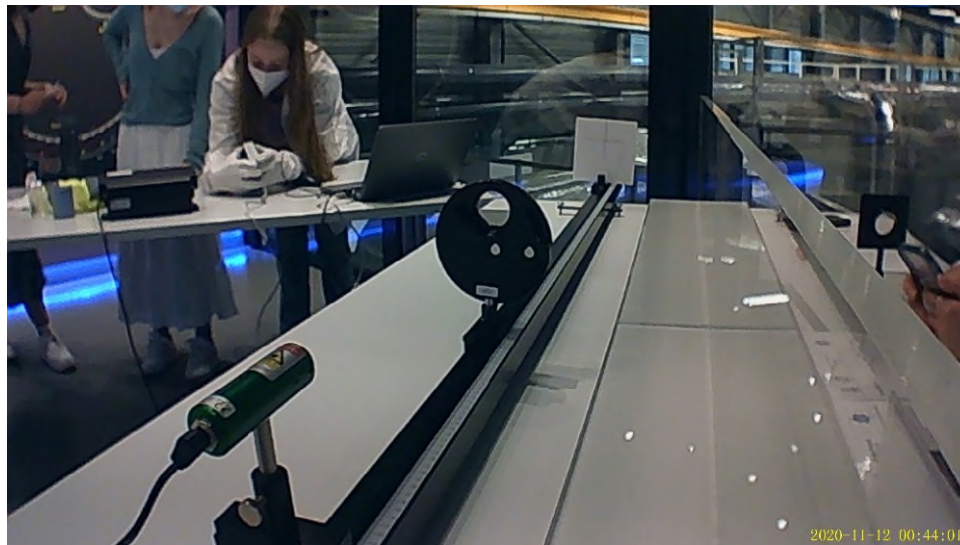


METHOD

4. Trigonometry to find θ
 5. Repeat at various lengths
 6. Use Bragg's slit equation to find d
- $$\lambda = d \sin \theta$$



7. Number of slits
8. Average circumference: πd
9. Estimate length of track
10. Compare to given values



RESULTS

Length (lens to screen)/m	Distance between maxima/m	$\theta/^\circ$
0.3	0.11	19.3
0.4	0.16	20.6
0.5	0.19	21.5

- Average = 20.5°
- $d = 1.52 \times 10^{-6} \text{ m}$

- Number of slits = 21.7×10^3
- Average circumference = $2.61 \times 10^{-2} m$
- Storage Length = 5.66 km
- Mystery disk = CD

- Mystery disk is a CD
- This experiment is reproducible





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