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PROGRAMME SEQUENCE LIST

CU S100/29

Title : Science course unit 29.
Clock title: Quantum theory.
Contributors : M.J. Pentz
F.R. Stannard

Tape No. 6LT/70087
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530.12

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Seq.	Time	Footage	Sequence List	Sound Cue
	1'15"		M.J. Pentz demonstrates the pressure of light on a gold foil suspended from a long quartz fibre in an evacuated glass vessel. The foil is made to oscillate by the light beam.	
1.	2'11"		M.J. Pentz performs an experiment to demonstrate the <u>photo-electric effect</u>. Photons of light are directed at a zinc plate setting up a measurable electric current which is monitored on a micro-ammeter.	537.54
	3'04"		Pentz places a sheet of glass between light source and zinc plate. No electric current is generated.	to do just that
	4'00"		F.R. Stannard with the apparatus which will provide the data for calculating <u>Planck's Constant</u>. The experiment will show how the intensity and frequency of light affect the photoelectric current and energies of emitted electrons.	Well this is a ...
2.	4'35"		Apparatus directs light of different wavelengths and intensity at a target. Stannard explains and demonstrates.	
	5'41"		Stannard holds a phototube and explains how it works. He uses a model of the tube to aid his explanation. The phototube is the target and sets up an electric current when bombarded with photons.	
	6'18"		Stannard demonstrates the effect of change of light intensity. Photocurrent drops as intensity is reduced.	

Seq.	Time	Footage	Sequence List	Sound Cue
	7'35"		Stannard used the phototube model to explain how electron energies can be calculated (electrons emitted from tube during photon bombardment).	
2.	9'03"		Stannard performs the experiment to calculate electron emission energy. He asks students to take down the readings. He then asks the students to determine Planck's Constant from the data they have.	determine Plack's constant
	11'30"		Pentz considers electron diffraction as evidence for the wave-particle nature of light. Pentz demonstrates diffraction of photons by placing a piece of silk over the lens of a T.V. camera which is looking at a light source. Shot of the light diffraction pattern which results.	Well, its quite clear 535.4
3.	12'55"		Stannard will use superimposed rule gratings and monochromatic light to study a more precise diffraction pattern. Shots of diffraction patterns of various colours of monochromatic light.	
	13'52"		Stannard explains, with the aid of a diagram, how electron diffraction patterns can be shown on a fluorescent screen.	
	16'48"		Film sequence showing Dr. Germer demonstrating electron diffraction by reflection on a crystal surface. This is the experiment by which electron diffraction was discovered in 1927 by Davisson and Germer in the U.S. and by G.P. Thomson in Britain.	Germer, Lester H.
	18'48"		Stannard does the electron diffraction experiment as done by Thomson. Thin metal foil is used as a target. The diffraction pattern of light is shown and then the pattern of high-energy electrons.	Thomson, G.P.
	20'21"		Stannard shows and explains the experimental apparatus.	

PROGRAMME SEQUENCE LIST
Continuation

Seq.	Time	Footage	Sequence List	Sound Cue
	21'15"		Electron diffraction patterns shown at various voltages. Pattern expands as voltage is decreased.	
	21'56"		Stannard asks students to verify the de Broglie formula.	
	23'29"		Pentz and Stannard use extrance and exit through 2 doors as an analogue of a portion of the Youngs experiment. He asks students to think about this as part of a self-assessment test.	
4.	23'44"		Credits	