

Date: 18/2/18	Lesson: Physics	Year: 12/13	Levels: Any	Tutor: Group 13
Topic: Quantum mechanical effects using bouncing droplets				
	Time	Plan		
Learning objective and outcome		<ol style="list-style-type: none"> 1. How droplets can bounce on a vibrating surface 2. What quantum mechanics is, and what effects we can observe some of these things from the apparatus 3. Have an insight into undergraduate physics and some of the hands on work it can entail 		
Introduction	5 mins	Things to do: <ol style="list-style-type: none"> 1. Introduce ourselves and the reasons we're there for. 		
Starter	10 mins	Start discussion into what quantum physics is. To facilitate audience participation, ask students to discuss amongst themselves for 3 minutes and propose ideas. Then ask for these ideas, and add/correct responses as required		
Mini-lecture	10 mins	<p>How do droplets form? (Diagram on board?) Explain that (but not how) these droplets demonstrate QM behaviour</p> <p>Starting from basic diagrams and maybe a recording of bouncing droplet motion, explain how droplets bounce.</p> <p>Then explain that these droplets replicate quantum behaviour. Attempt to limit the scope of this behaviour by mentioning specific effects. Don't explain how this link occurs yet.</p>		
Demonstration	10 mins	<p>Explain apparatus and highlight important components.</p> <p>Execute a run through of the apparatus (need to find a way to get a live feed to projector). Specifically demonstrate:</p> <ol style="list-style-type: none"> 1. Bouncing droplets 2. Walking droplets 3. Multiple droplet motion <p>Take time to allow for students to run through experiment themselves, e.g. by making droplets and playing with the frequencies/bass. As there is only one apparatus, take suggestions from students.</p>		
Discussion	10 mins	<p>ACTIVITY: Discuss in groups how these droplets display behaviour. Ask students to also note down any interesting behaviours they observe.</p> <p>May have to use lab based recordings/ simulation for double slit diffraction or other interesting effects we want to mention</p>		
Plenary	10 mins	<p>Assert that droplets demonstrate XYZ behaviour, make limitations clear.</p> <p>Wrap up by emphasising learning objectives, link to Veritasium for more details</p> <p>It would be quite useful to part on an entertaining note. See if music/ colourful lights can make the apparatus do something more exciting.</p>		
End of session	10 mins	10' Q&A on Physics at Uni, completion of end of session assessments.		
Key Words		Pilot wave theory, guiding wave equation, wave particle duality, Destructive and constructive interference		