PING-PONG TUNNELING

AYUSH GUPTA

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--Ayush Gupta (11-06-2025)

One day in a random evening I was playing table tennis then noticed something profound, in the net of table tennis, there is a small gap underneath so normally if you throw a ping-pong ball very slowly through that gap then it wouldn't pass through it but if you speed it up, then it will pass.

Table tennis net, image from - https://www.experttabletennis.com/the-best-table-tennis-nets/

So, my brain jumped directly to quantum tunnelling here. Suppose if we capture a snapshot of slow-moving ball and a fast-moving ball just when it collides the net, then in both cases we can see the ping pong ball's a little bit surface across the other side too. If a Classical physicist looked at the snapshot, he would say that the ball is maybe at rest or moving while if a Quantum Physicist looked at the snapshot, he would probably say that there's a little probability of ball existing on the other side of the net (due to quantum tunnelling) and major probability that the ball stays on the same side without crossing the net. But in this case whether the ball goes through the net or don't is defined by an "internal variable of ball" the velocity or momentum that isn't captured in a snapshot, so if a Quantum Physicist looks at 100 snapshots he will say it's just like a wavefunction because from the perspective of him, the ball staying at which side of the net is purely probabilistic but the reality was just a hidden variable not captured in snapshots.

What if in real quantum mechanics too there's a hidden variable that we can't capture??

Let's crack my own thought experiment to make the quantum physicist and classical physicist come at the same conclusion and remove the probabilistic part. Earlier we were just observing the ball's snapshot but now we are adding another component to measure the hidden variable, we will use a speedometer for measuring the velocity just when the ball strikes underneath the net and capture the ball's snapshot with the speedometer reading, and boom we have cracked the hidden variable mystery, and now anyone can come to a conclusion that the ball requires a certain threshold velocity to cross the net.

What if in quantum mechanics too, instead of just observing the particle if we could add another device that measures that hidden variables then I guess we could crack open this probabilistic part of quantum mechanics? Maybe it's just like Einstein said -- "God doesn't play dice".