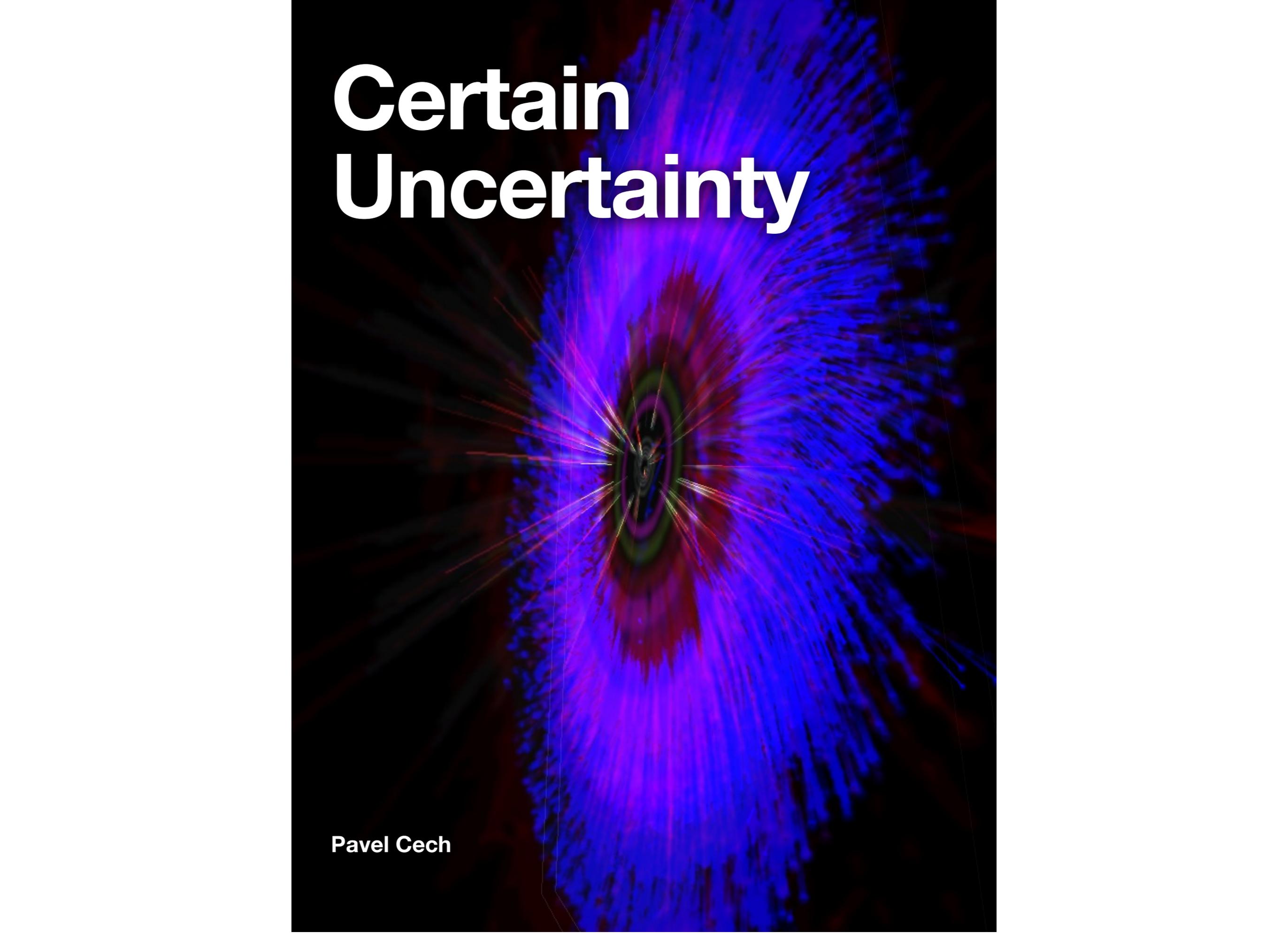


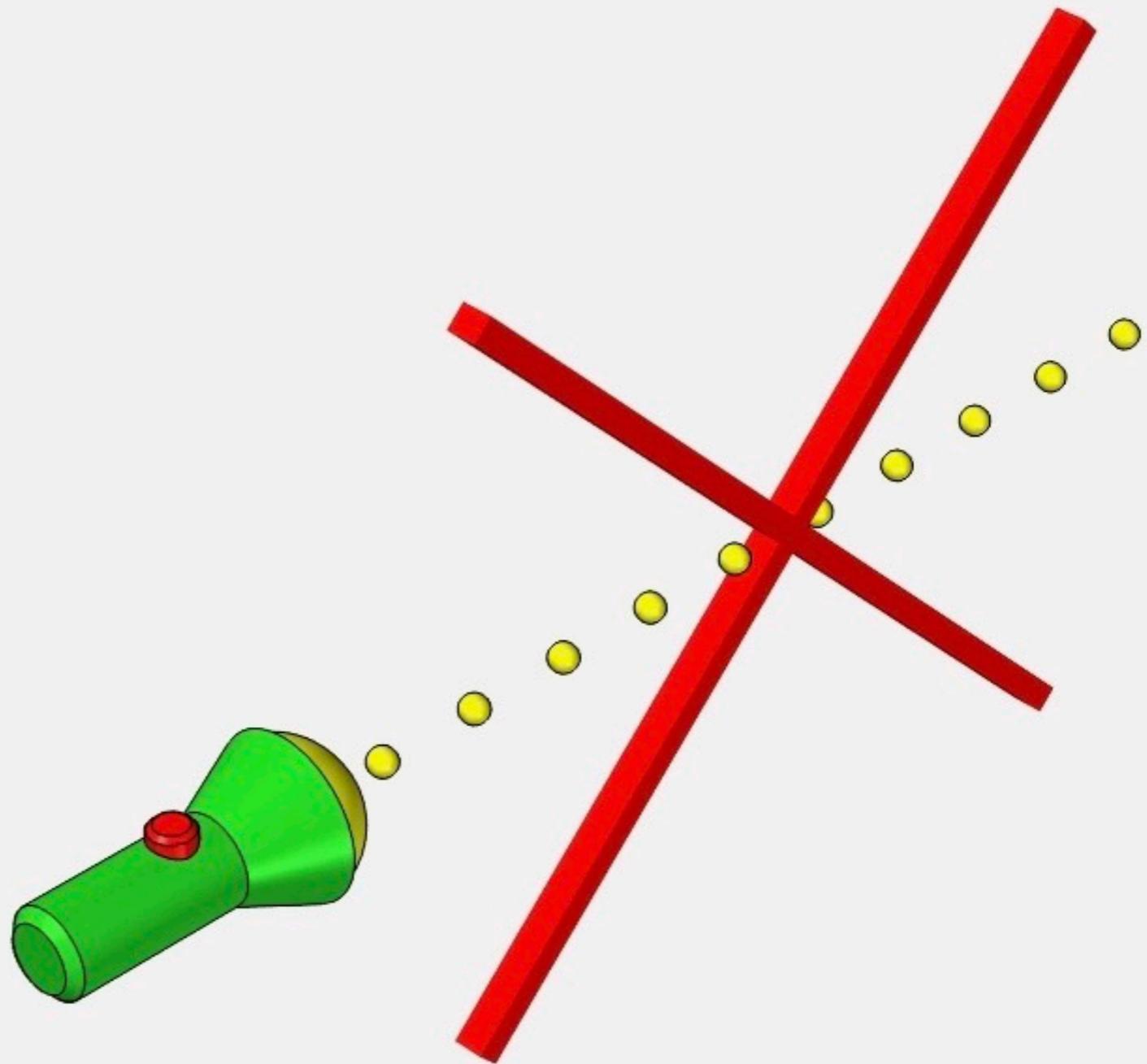
Certain Uncertainty

The background of the slide is a dark, almost black, field filled with a complex pattern of light trails. These trails radiate from a central point, creating a sense of depth and movement. The colors are primarily deep blue and vibrant purple, with some hints of red and green. The trails appear to be composed of many fine, overlapping lines, giving the overall effect a shimmering, ethereal quality. The light trails are most concentrated in the center and become more sparse and faint as they radiate outwards towards the edges of the frame.

Pavel Cech

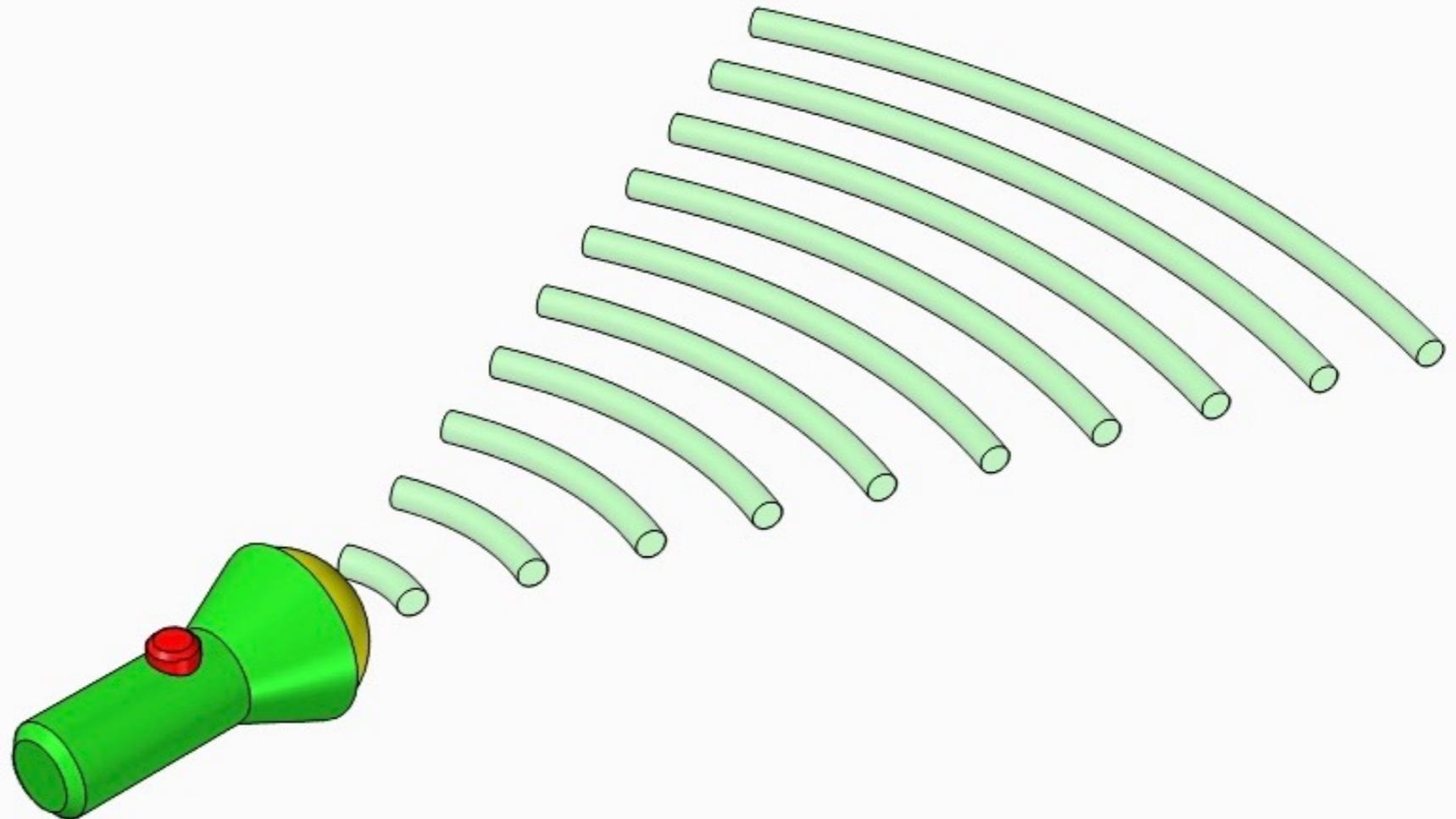
Wrong about Photons

When you switch on a light source it does not spit out photons....



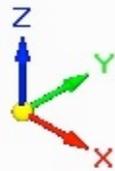
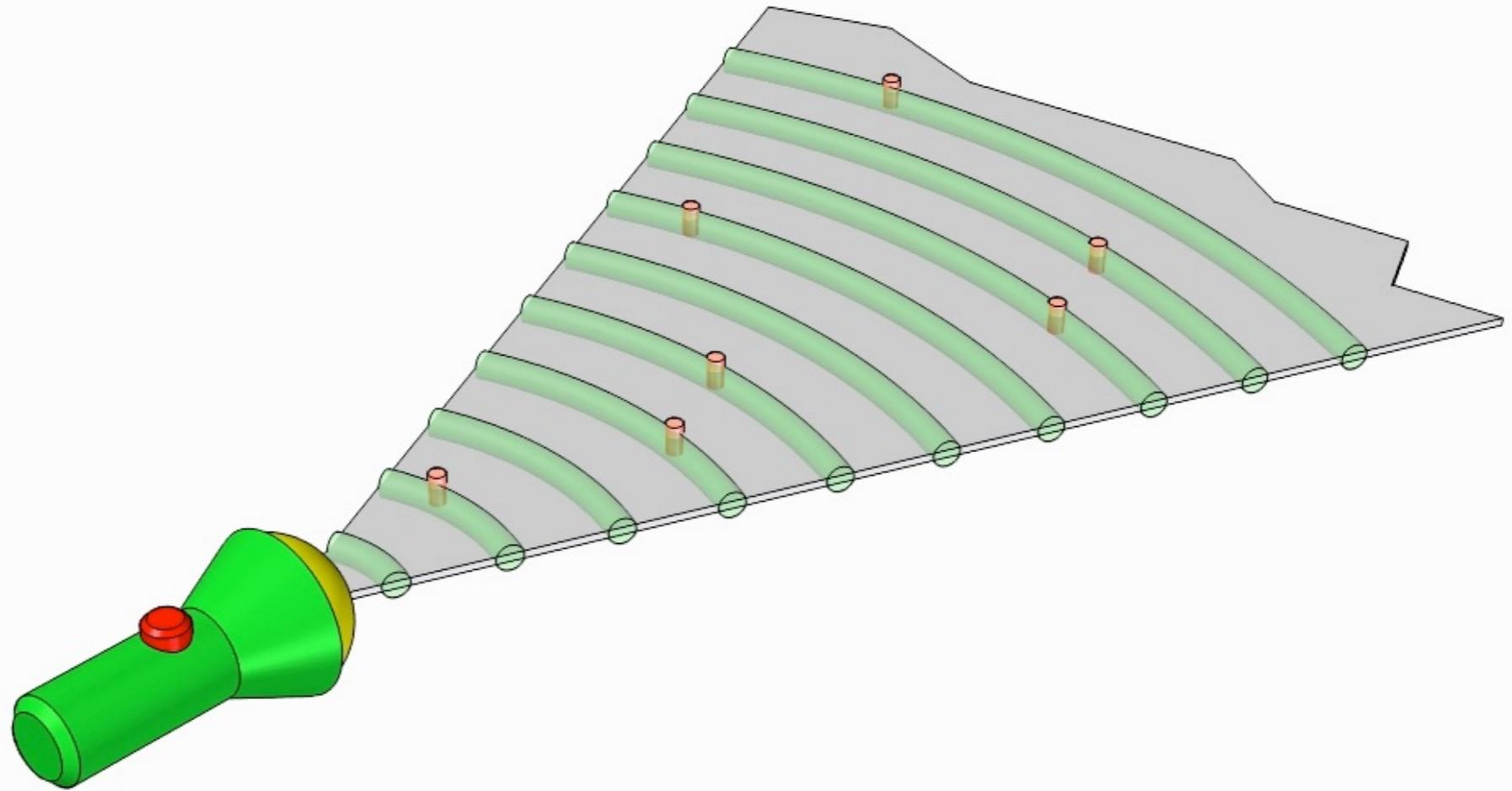
Waves

When the torch is on, it creates light waves rather than photons...



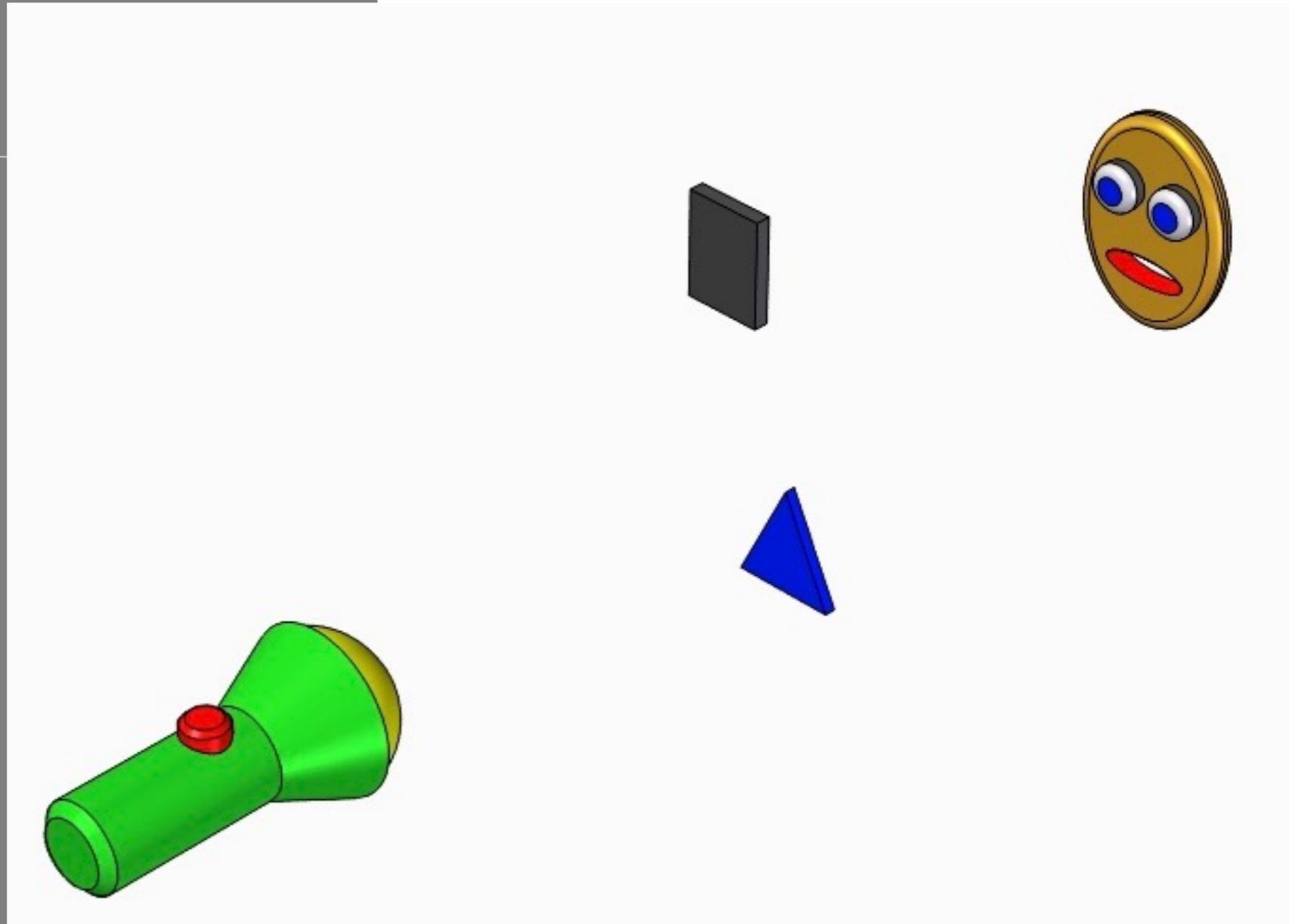
Where is it?

A photon can pop up anywhere in the light waves path (gray) as long as....



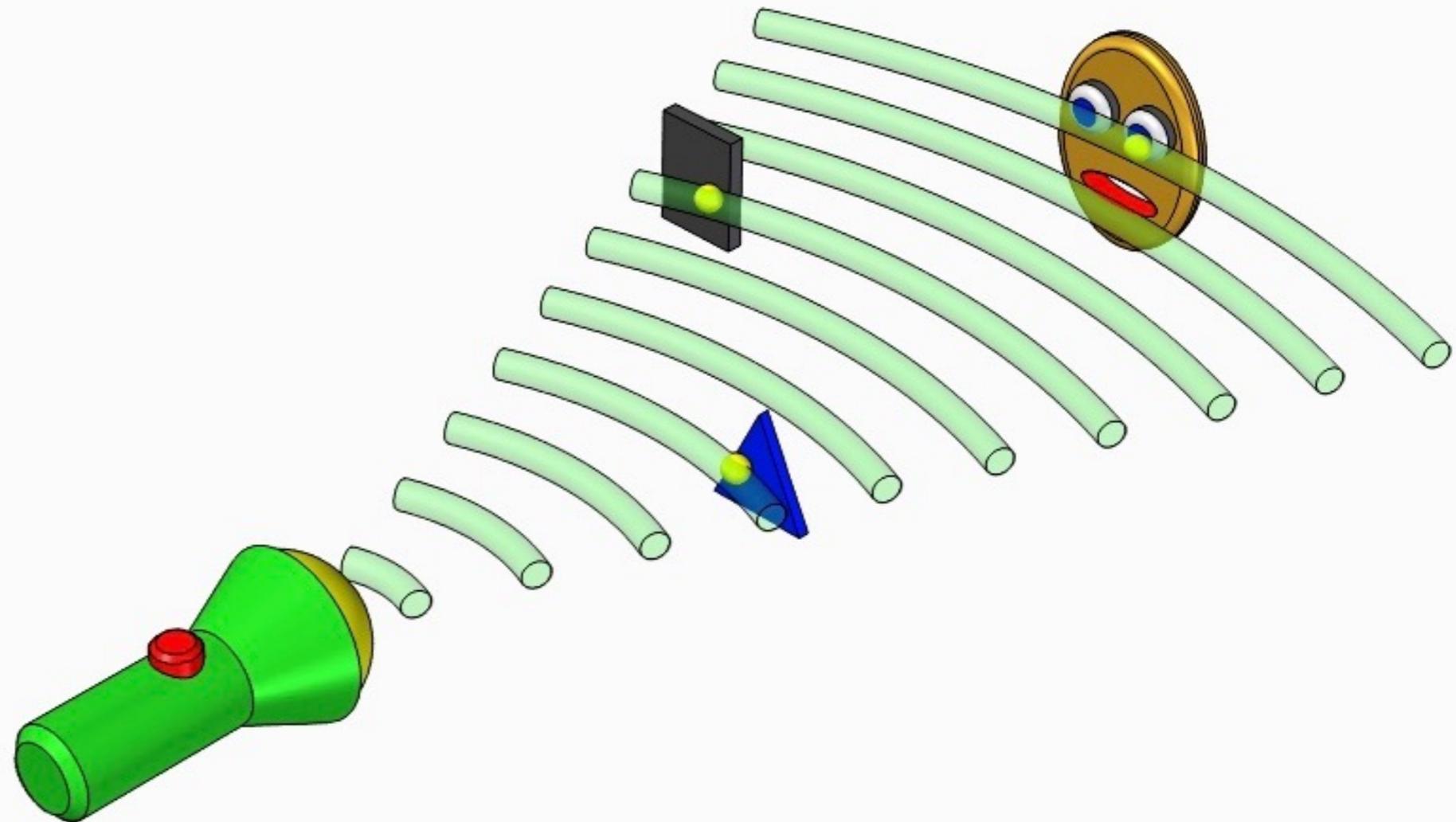
Photon "creators"

Let's place some obstacles in the path of the light waves...



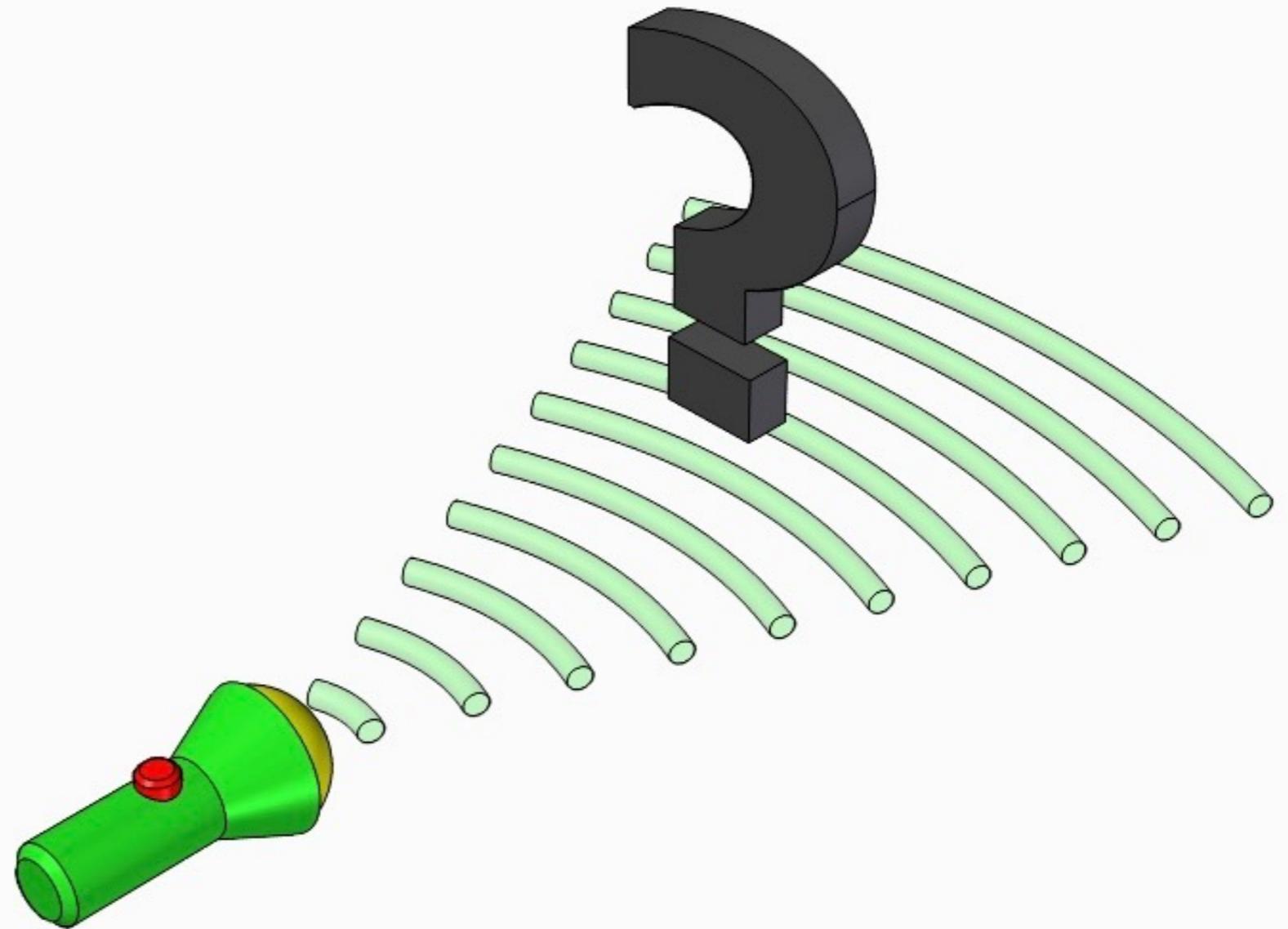
Photon Birth

As the torch is switched on the light waves hits an obstacle such as a sensor, brick och your eye. This is the moment when photons are first created as the wave energy converts to a particle (yellow).



Uncertainty

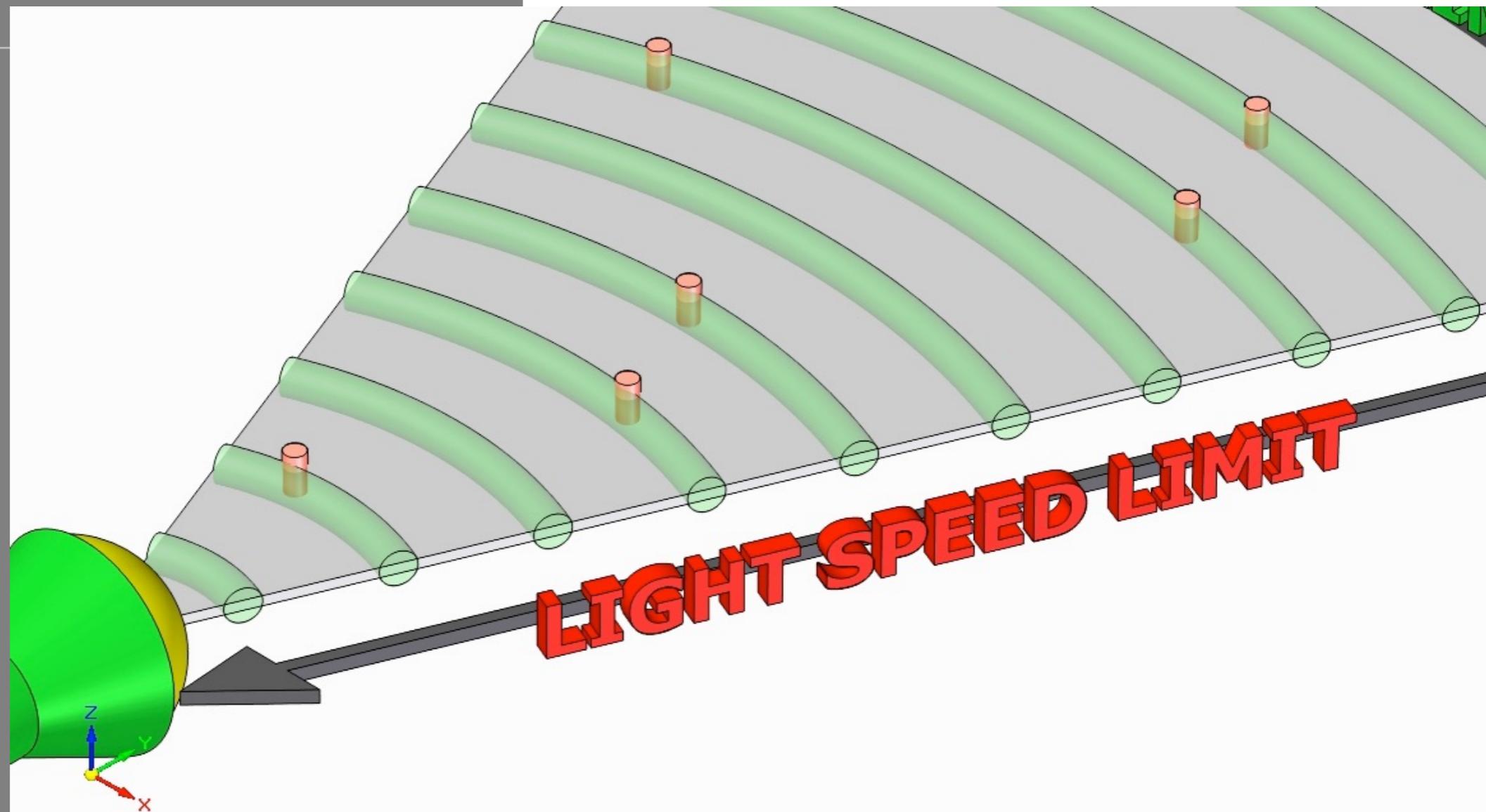
Quantum mechanics Uncertainty Principle states that we can never determine position and speed of a photon simultaneously.



Where and how fast?

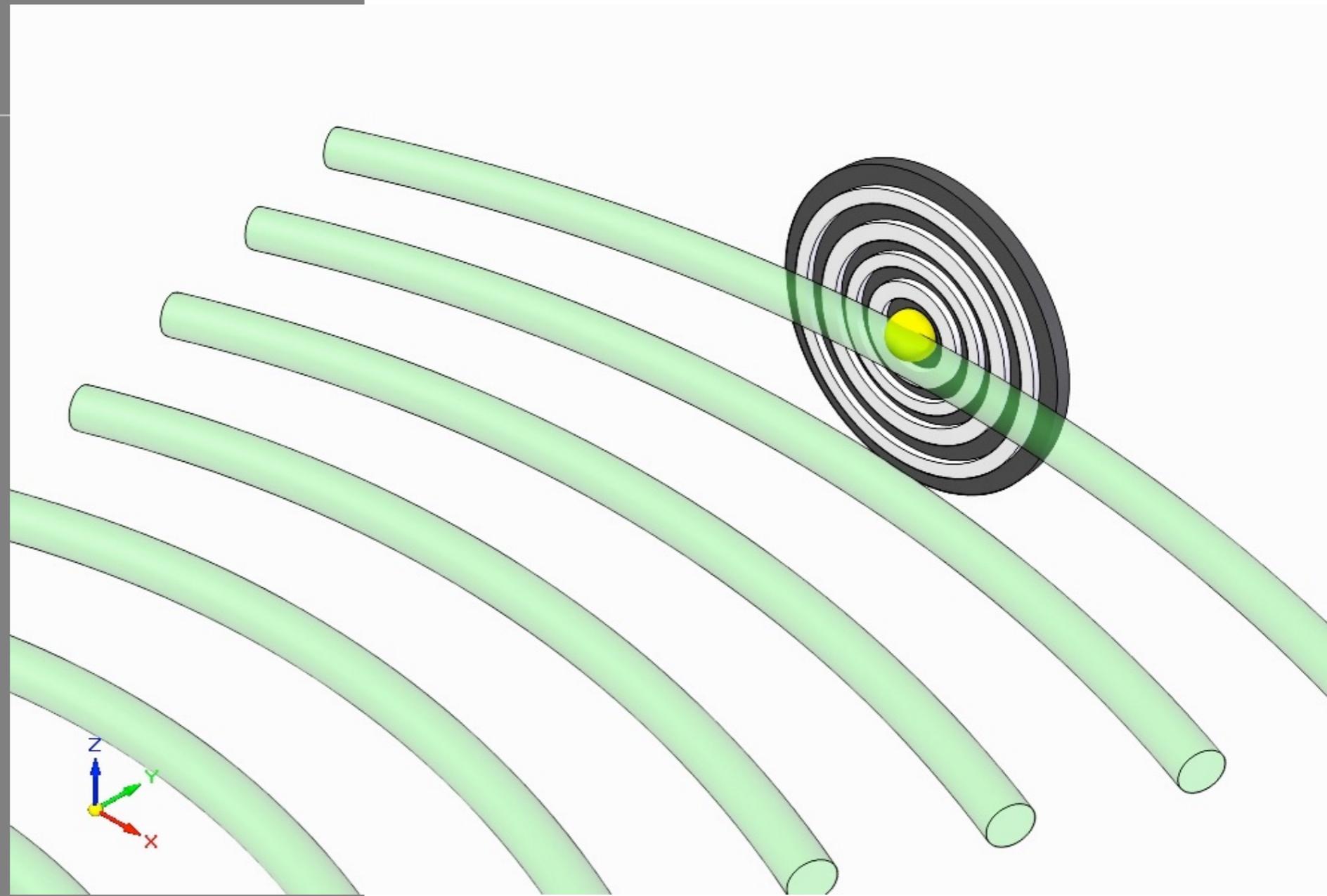
Photons can appear anywhere in the path of light waves but they are not here yet, to be find and measured.

Light waves propagate at different speeds in different media and at maximum speed in vacuum which can easily be measured.



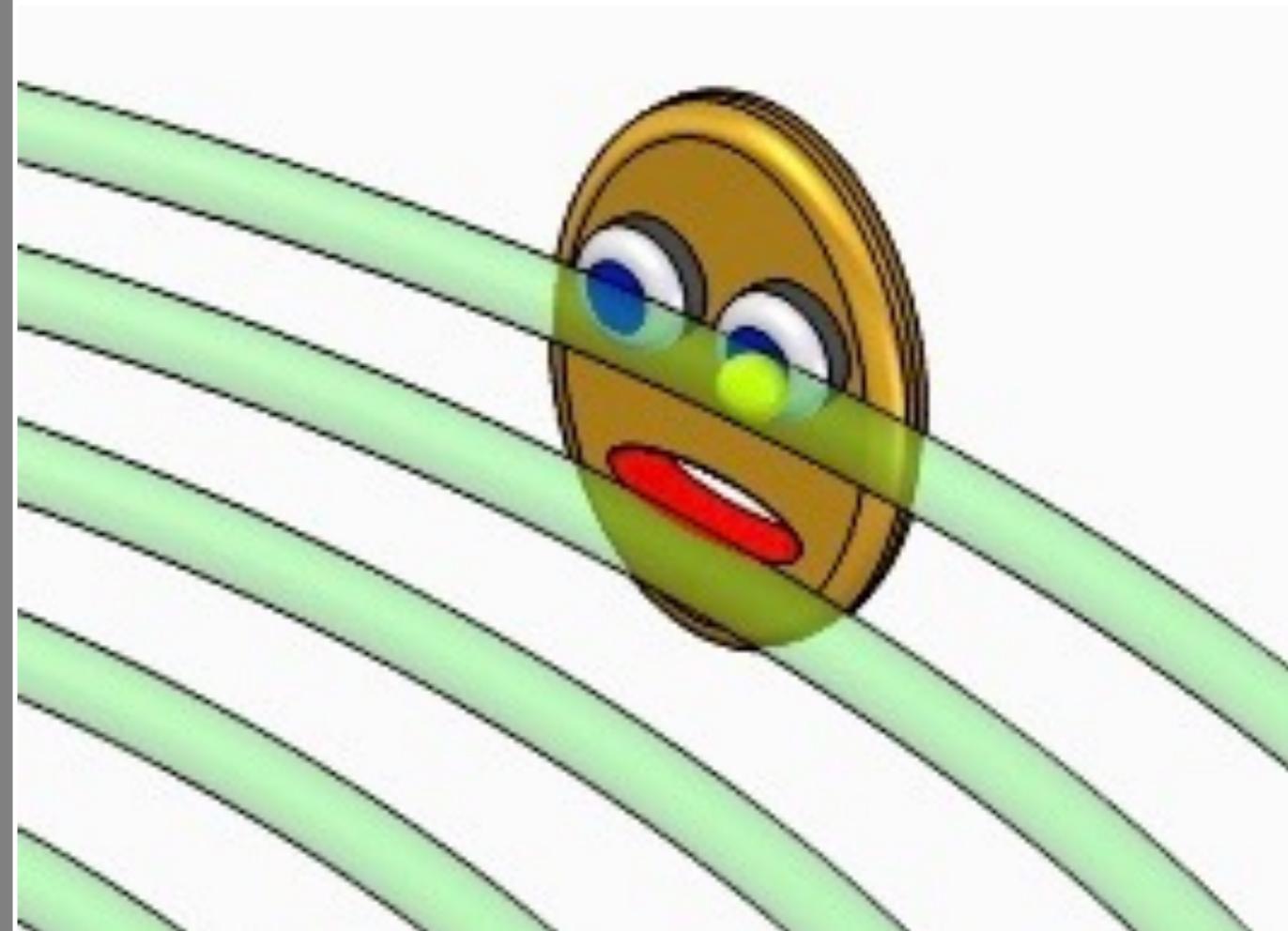
Target

Placing a target will let us know where the photon is, although it was our action, telling the light waves where to "spit out" a photon. The observer influences the result.



Decision just by looking

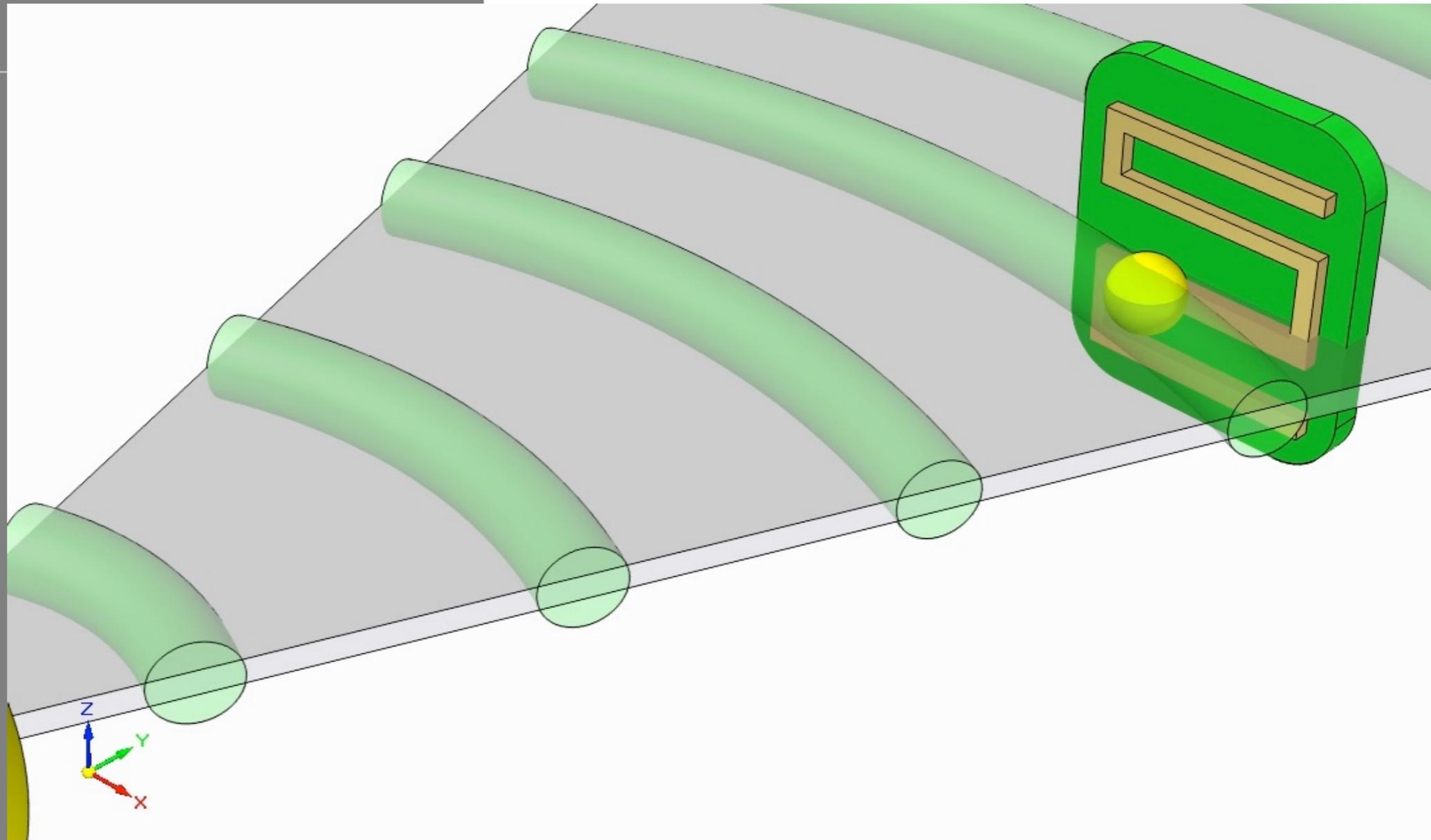
This means that we can be certain where the photon will be as WE DECIDE where to look.



Multiple Positions

Uncertainty Principle also claims that a photon can be present at several places in the space at the same time.

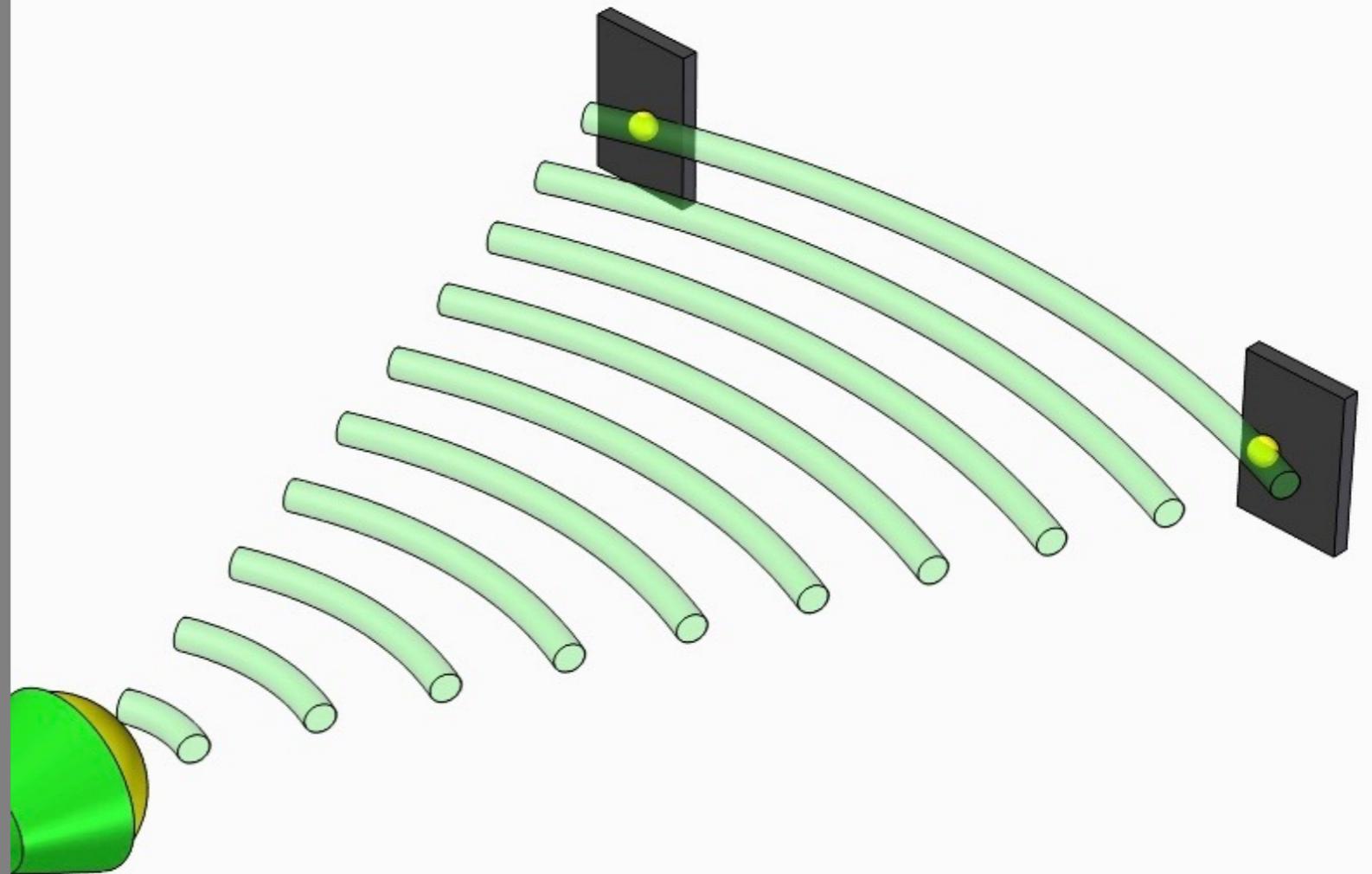
Although the light waves can create photons anytime and anywhere they propagate, they will not do it without hitting any kind of object, such as a gas molecule or a sensor (green).



Photon Identity

Now the picture shows two places with a photon each (yellow). Although both photons ride the same light wave they are not identical.

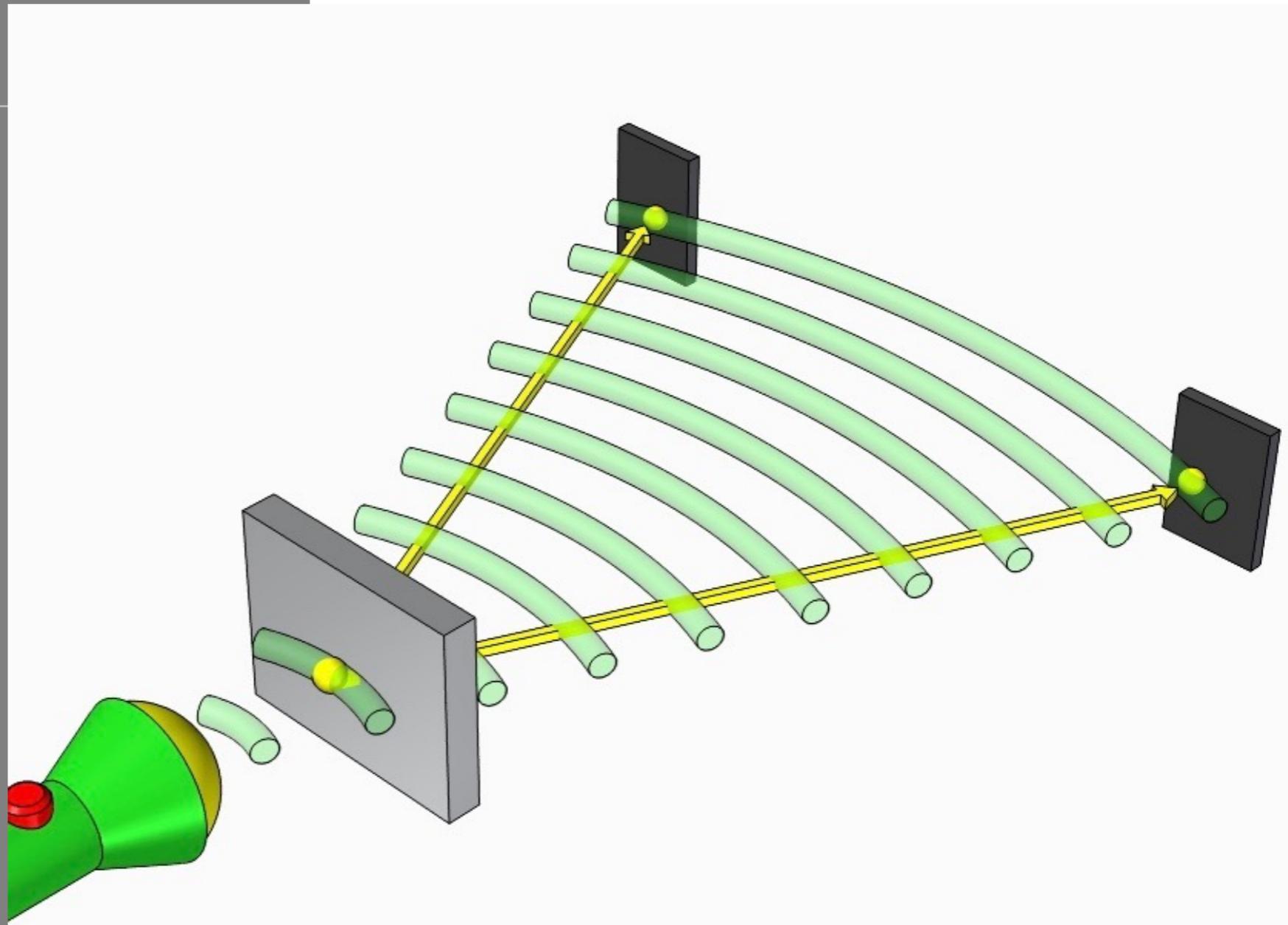
They might be "genetical twins with common mother wave", but if we remove one of the plates (black) then one of the brothers disappears.



Entanglement

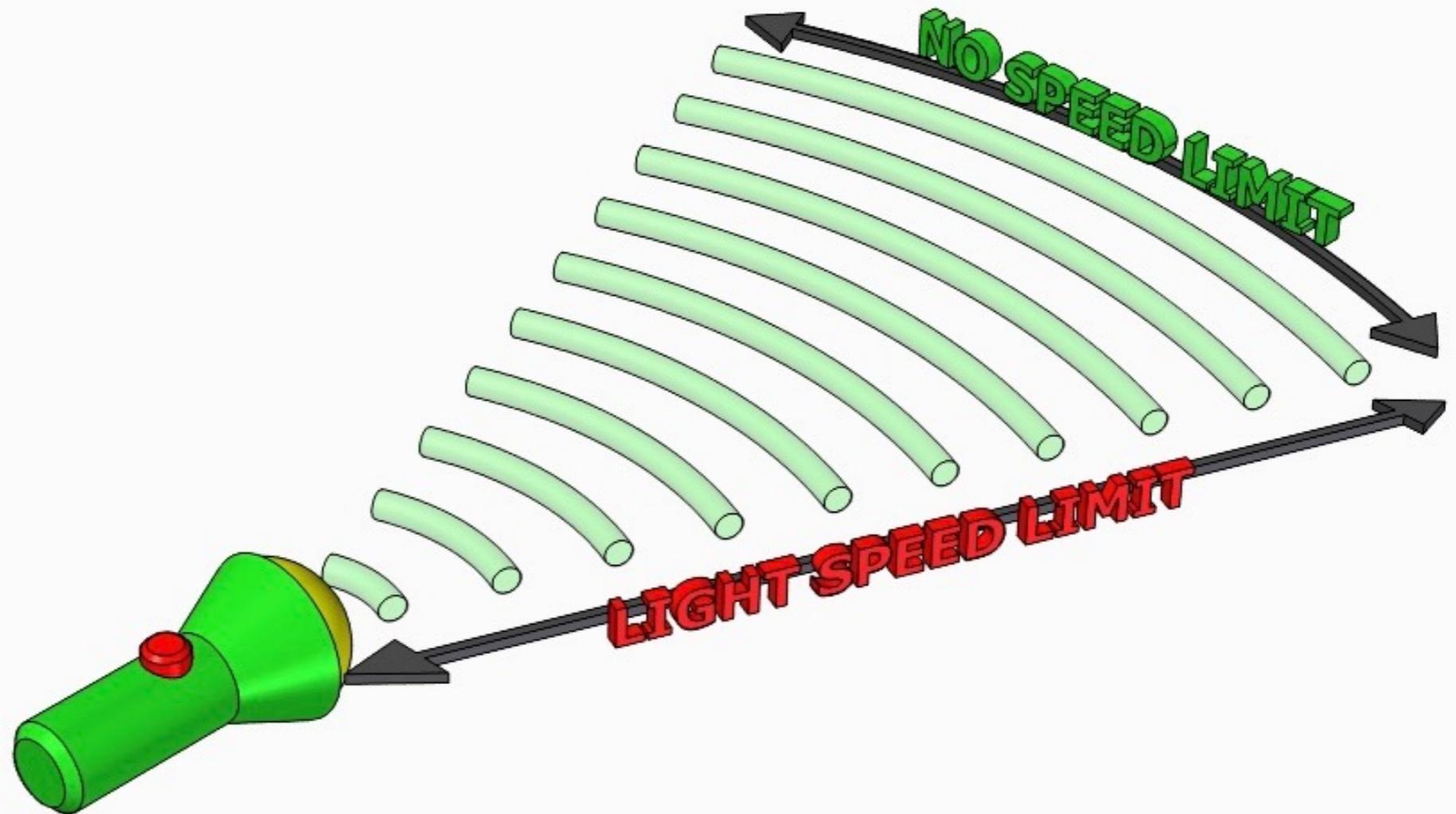
To get two photons entangled, which means related and acting simultaneously regardless distance, scientists use a special splitter device (grey).

Now both twins act synchronised and communicate faster than speed of light. How is this possible?



Limitless Speed?

As the waves propagate through Spacetime, their speed is limited to around 300 000 km/sec in vacuum, which is the maximum anything can move. Anything but the SpaceTime, which can and has expanded faster shortly after Big-Bang. However, perpendicularly to the wave propagation direction, we "surf on or inside" the wave, which seems to be a part of spacetime or, if you prefer so, acting a worm-hole.



Light Wormhole

If you measure, interact or simply hit one of the entangled photons, the other will immediately know and respond it.

Rarther than spooky,
Nature is Magic.

