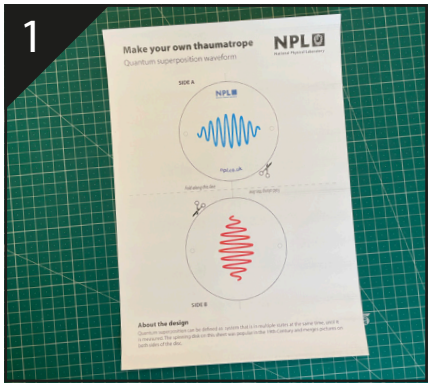
Make your own thaumatrope

National Physical Laboratory

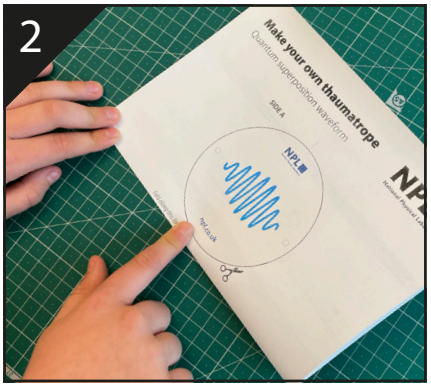
What you will need:

- Thaumatrope design printed on thick paper or card
- Glue
- Scissors
- Hole punch or sharp pencil and 'sticky putty'
- String (2 × 30 cm) or elastic bands (×2)



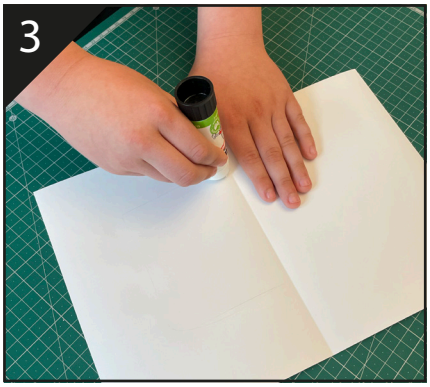
Step 1

Print one of the thaumatrope designs on thick paper or draw your own design using the blank template.



Step 2

Before cutting the circles out, fold in half along the central dotted line with the printed side facing outwards.

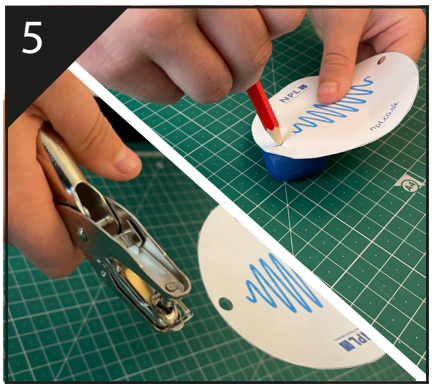


Step 3

Glue both sides together. Folding and gluing, before cutting out ensures sure that the design on both sides are in the correct position.

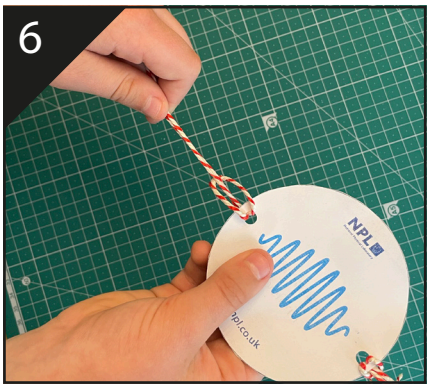
Step 4

Carefully and safely cut around the outer circle. Make sure you ask an adult for help if needed.



Step 5

Carefully create the side holes. You can use a hole punch or a sharp pencil and 'sticky putty'. Make sure you ask an adult for help if needed.



Step 6

Feed a piece of string or an elastic band through each of the side holes and secure with a knot.

Thaumatropes were popular in the 19th Century. When spun fast, the pictures on both sides merge due to the persistence of human vision. This design illustrates the concept of quantum superposition.

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Make your own thaumatrope

Quantum superposition waveform

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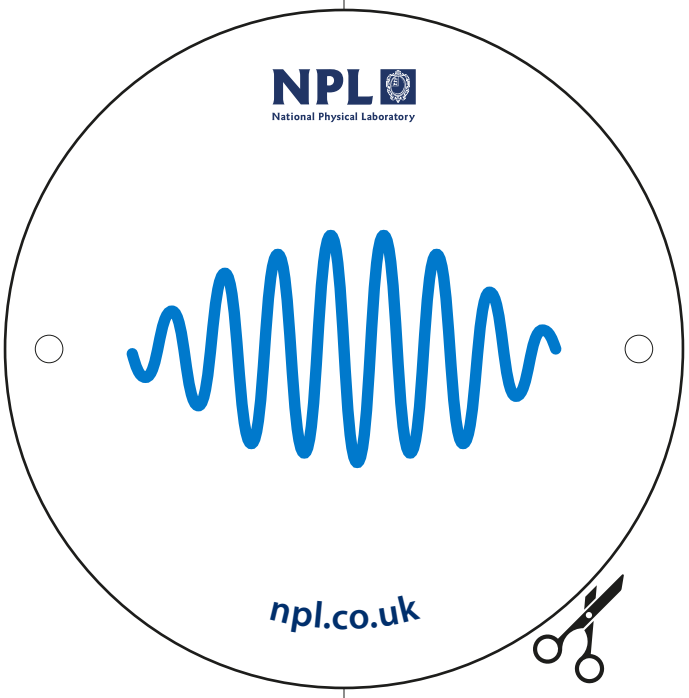
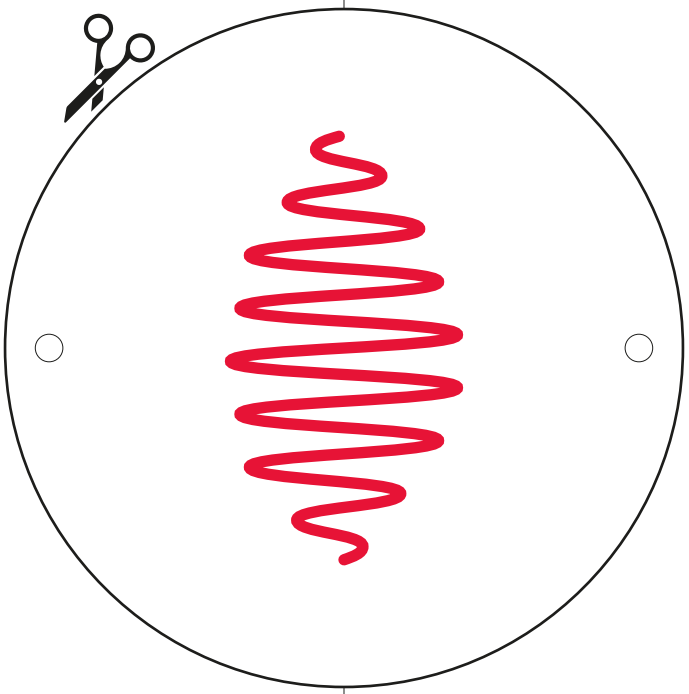
SIDE A



Fold along this line

Fold along this line

SIDE B



About the design

Quantum superposition can be defined as a system that is in multiple states at the same time, until it is measured. This design represents a single photon polarised vertically or horizontally. A quantum bit can be produced with the superposition of vertically and horizontally polarised photons. A photon can be thought of as a wave or a particle. This design represents the photons as a wave packet.

Find out more at: **npl.co.uk/quantum-programme/capabilities/photonics**

Make your own thaumatrope

Quantum superposition arrows

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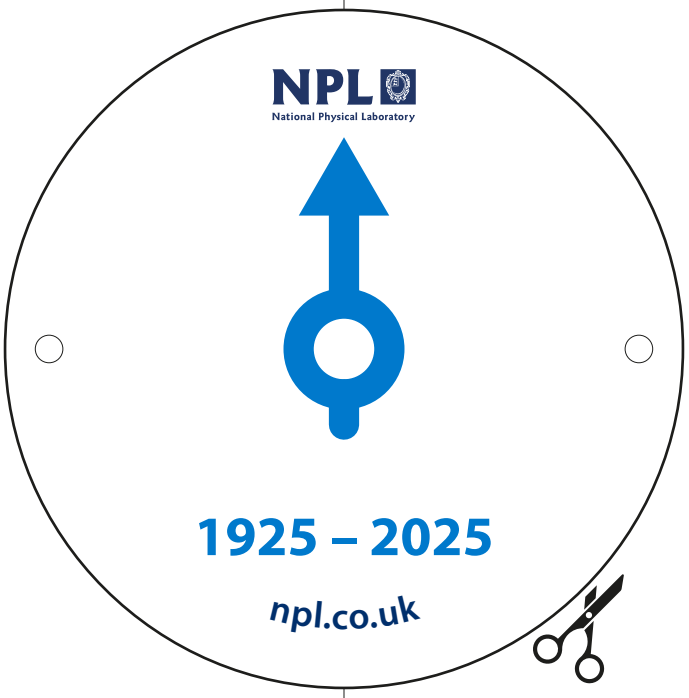
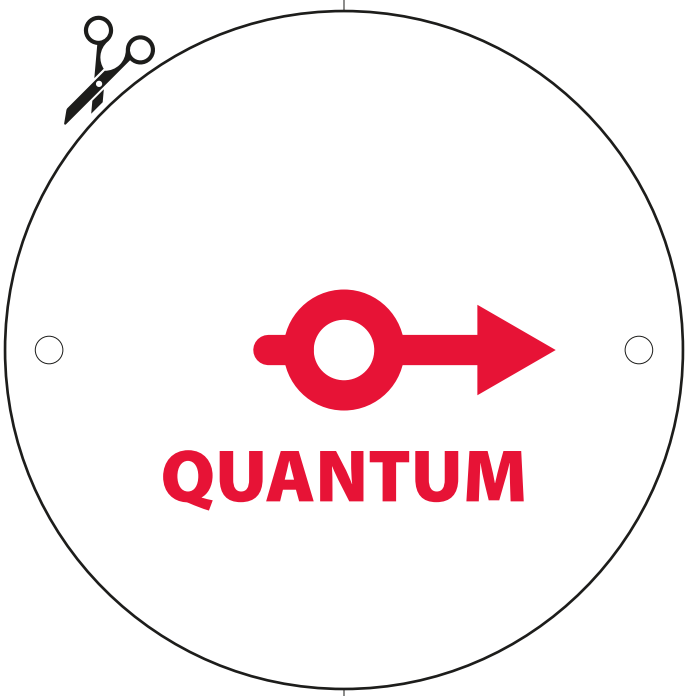
SIDE A



Fold along this line

Fold along this line

SIDE B



About the design

Quantum superposition can be defined as a system that is in multiple states at the same time, until it is measured. This design represents a single photon polarised vertically or horizontally. A photon can be thought of as a wave of a particle, this design visualises it as a particle. The arrow shows the direction of polarisation.

Find out more at: **npl.co.uk/quantum-programme/capabilities/photonics**

Make your own thaumatrope

SI bot and Bloch Sphere

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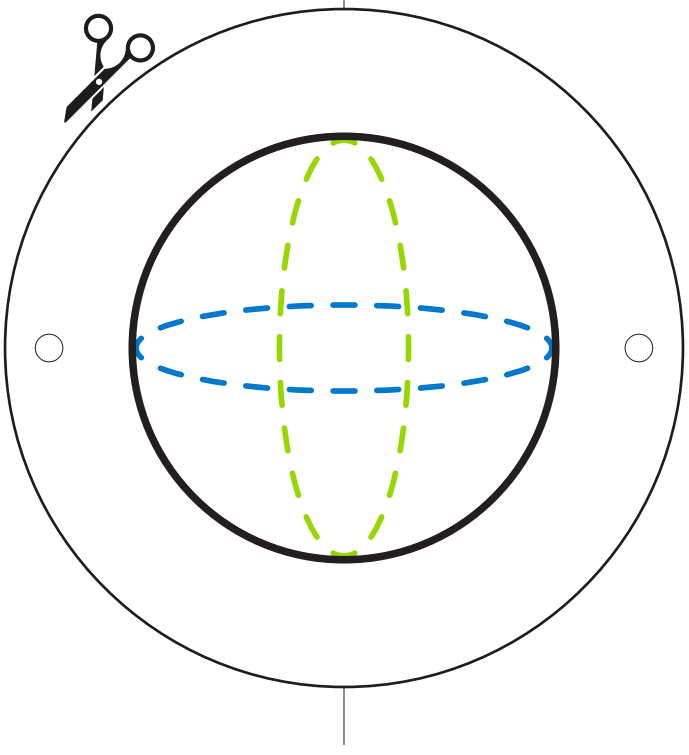
SIDE A

Fold along this line

Fold along this line

SIDE B



About the design

On one side of the disc there is an NPL SI Bot which represents the seven SI units of measurement. On the other side is a representation of a Bloch Sphere. This is a graphical tool used in quantum physics to represent quantum bit states.

Find out more at: **npl.co.uk/quantum-programme/capabilities/photonics**

Make your own thaumatrope

NPL - celebrating 125 years

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SIDE A

Fold along this line

Fold along this line

SIDE B

About the design

This design celebrates 125 years of NPL. It features our SI bots, which represent each of the seven base units of the International System of Units. This system is used to ensure that everyday measurements remain consistent worldwide.

Discover how we are celebrating 125 years of NPL at: **npl.co.uk/125**
Find out more about the SI units at: **npl.co.uk/si-units**

Make your own thaumatrope

Blank template

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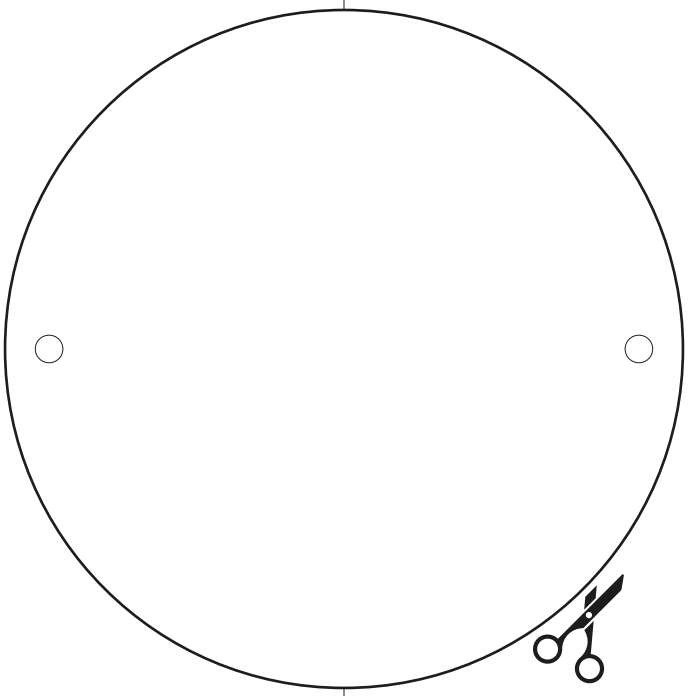
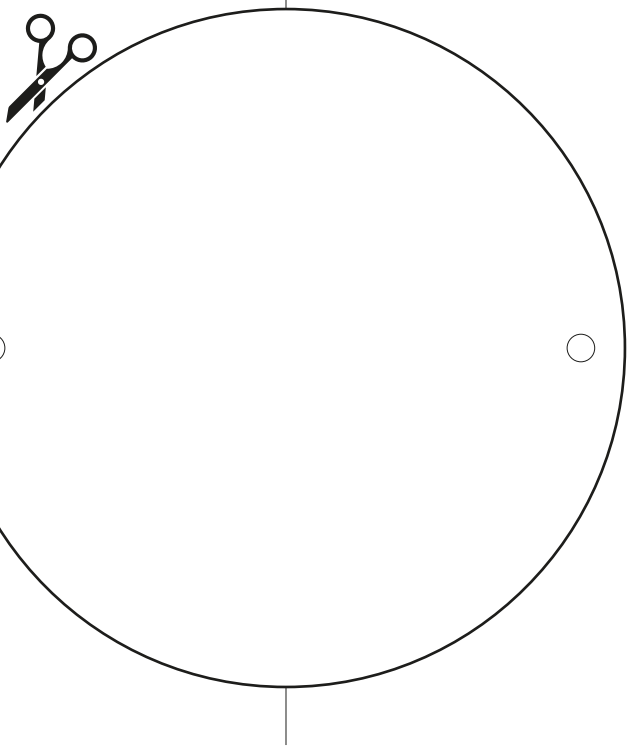
SIDE A



Fold along this line

Fold along this line



SIDE B