

The Tippe Top

Turns upside down when spun fast

Instructions:

Bring the top to a fast spin. The surface must be slightly rough; a wooden table works fine for example. On smooth polished surfaces, like glass or lacquered wood, the Tippe Top might not flip over.

The reason why this special spinning top turns upside-down and then continues to dance on its handle, and which physical laws are responsible for this, still puzzles physicists even after more than 100 years and countless scientific papers. At the 1960 Nobel Laureate Meeting in Lindau on Lake Constance for example, the Tippe Top was heatedly discussed for three hours, until nobel prize winner Niels Bohr finally left the room with the words: "What do you want? After all, it works!"

The Tippe Top was invented by the Munich nurse Helene Sperl at the end of the last century. On 7th October 1891 she received patent No. 63261 from the Imperial Patent Office in Berlin. In addition to the spherical shape, the patent included the fact that the centre of gravity of the Tippe Top needs to lie below the centre of the sphere. This is the reason it acts like a roly-poly self righting toy, with the handle always pointing upwards. However, in magic circles it has long been known that a ball with a hidden lead insert and thus an eccentric centre of gravity, turns upside-down when rotated rapidly, so that the lead no longer lies below but above the centre of the sphere. Nevertheless, it takes great skill to spin the ball fast enough. Helene Sperl solved this problem in an ingenious way: the ball is hollowed out at the top, shifting the centre of gravity downwards, and a handle makes it easy to spin the top fast enough.

Even if proper research has to be left to specialised physicists, you can very easily carry out an interesting experiment yourself:

If the Tippe Top is started rotating in a clockwise direction, in which direction does it turn when it is upside down? The result is not trivial!

And now: Have fun with your Tippe Top!

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Nobel Prize winners W. Pauli and N. Bohr examine a Tippe Top (Lund University, 31 May 1951)

Further reading:

https://en.wikipedia.org/wiki/Tippe_top

<http://www.fysikbasen.dk/English.php?page=Vis&id=79>

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Set with 3 tops made from wood



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