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Now you see it, now you don't

A SINGAPORE-BASED scientist and his team have created an "invisibility cloak" that can make objects and even tiny animals disappear. While still at an early stage, the light-bending technology behind the glass "cloak" may have useful applications in security and defence, such as in developing military surveillance equipment. PAGE B2



Assistant Professor Zhang Baile shows off the "invisibility cloak", which can hide small objects. ST PHOTO: DESMOND FOO

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NTU don makes object vanish with 'invisibility cloak'

Young scientist and team create glass innovation that bends light

By HOE PEI SHAN

IT MIGHT seem like a magic show performed by legendary illusionist Harry Houdini but a Singapore-based scientist and his team have managed to create an "invisibility cloak" that can make objects and even small animals such as cats disappear.

Believed to be the first of its kind, the research in this area by a team led by Dr Zhang Baile, a Singaporean permanent resident, was published two weeks ago in Nature Communications, one of the top science journals.

Using carefully angled blocks of glass to form a wall around an empty core, light is bent around an object - or living creature -

placed in the centre. The object then appears to be "invisible", allowing the viewer to see only what's behind the glass "cloak". While the research is still at an early stage, the light-bending technology behind the glass "cloak" may have useful applications in security and defence, such as in developing military surveillance equipment.

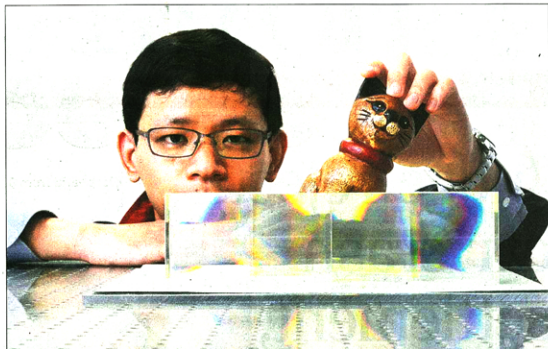
"It is not quite like Harry Potter's cloak of invisibility because this is not an actual cloak that you can wrap around you yet - it's a glass structure but you can 'see through' an object placed in the centre in a natural environment," said Dr Zhang, assistant physics professor at the Nanyang Technological University.

The 32-year-old Dr Zhang collaborated with six other scientists, including members of Zhejiang University in China and Marvell Technology Group Boston, over the last three years to come up with the innovation, which was showcased for the first time in Singapore yesterday.

With the capability to function in open air, it is a significant improvement over his previous prototype, made of a colourless crystalline mineral called calcite, which can only make an object "invisible" in a liquid called laser oil.

Even then, Dr Zhang's earlier work had already put him on the list of the world's top 35 innovators under the age of 35 compiled by the Massachusetts Institute of Technology's Technology Review magazine in August last year.

While he is pleased with the progress so far, Dr Zhang admitted that the research is "still far



NTU School of Physical and Mathematical Science researcher Zhang Baile showing how his team's "invisibility cloak" works. The research is believed to be the first of its kind in this area. ST PHOTO: DESMOND FOO

away from actual applications".

The "cloak" as it is now still suffers from several limitations: It can make things invisible only when viewed from up to six specific directions, although the team is working to make it omni-directional. It is also a bulky construct that is difficult to move around.

"It's progress but it's not particularly revolutionary, it's not true invisibility if it only works

from six directions," said Professor John Pendry, the chair in theoretical solid state physics at the Imperial College of London whose work in cloaking objects in electromagnetic fields is the basis of Dr Zhang's initial research.

"Cloaks are very useful things for... stealth or security, so when they get it omni-directional, I shall be impressed."

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WATCH THE VIDEO
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Find out how the "cloak" works



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