From the Klingon cloaking device on their Birds of Prey ships to Harry Potter's cloak, science and fantasy fiction is awash with invisibility devices. And now, the community of defence and technology online is in a veritable frenzy today with the news that scientists have created a material that can bend light in three different dimensions, rendering objects invisible.

The team at the University of California at Berkeley and the Lawrence Berkeley National Laboratory have created a material that deflects light around an object as perceived by the human eye.

For now the process takes place on a nano-scale measured in billionths of a metre but the team, headed by Xiang Zhang, state that there is no reason why the same principles cannot be scaled up one day to make invisibility cloaks to hide a person, a tank or even something larger.

Recent advances have created other so-called meta-materials; artificially engineered structures with optical properties tat bend light in unnatural ways. Up till now, such meta-materials had three serious limitations.

One was that they only worked on the microwave range of the light spectrum, bending wavelengths much too long to be visible to the human eye. The earlier technology was also limited to two-dimensional systems no thicker than a single layer of atoms. Finally, a large portion of the light was absorbed rather than refracted, a form of energy loss that reduced the "invisibility" factor.

The AFP reports however that this new material, by contrast, produces the negative refractive needed to work within a visible light spectrum and in three dimensions.

Negative refraction -- or "left-handed" -- materials deflect light in a way that breaks the standard "right-handed" rules of electromagnetism.
"In the case of such cloaks or shields, the material would need to curve light waves completely around the object like a river flowing around a rock," Zhang said.

"An observer looking at the cloaked object would then see light from behind it, making it seem to disappear."

Prof Zhang says the materials "bring us a major step closer to the development of practical applications for metamaterials."

"What makes both these materials stand out is that they are able to function in a broad spectrum of optical wavelengths with lower energy loss," said Prof Zhang. But they also caution that they are still far off from invisibility cloaks and other applications that may capture the imagination.