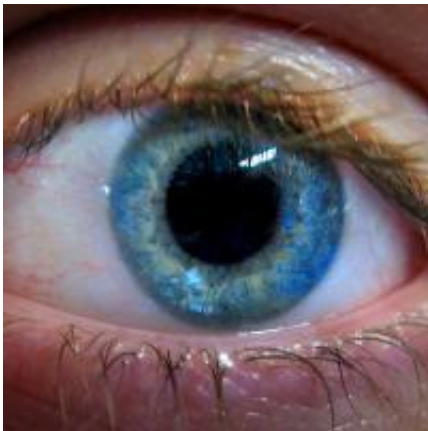


Throwing light on a mysterious human 'superpower'

March 2 2015



Most people, at some point in their lives, have dreamt of being able to fly like Superman or develop superhuman strength like the Hulk. But very few know that we human beings have a "superpower" of our own, which almost anybody can perform by simply staring at the computer screen in front of them. As physics teacher David Shane explains in March's issue of *Physics World*, human beings have an astonishing ability to detect the polarization of light with just the naked eye.

Even though this "superpower" is not on the scale of those paraded by comic book heroes, many of us don't know that this [natural talent](#) exists and a solid explanation as to why we are able to exhibit the bizarre skill has evaded the science community for centuries.

As Shane explains, the basis for the skill lays in the fact that light consists of electric and magnetic fields that oscillate, or "wobble", on axes perpendicular to each other.

The light that we observe from natural sources such as the Sun is often "unpolarized" – this means that the light waves reaching us all have electric fields that are orientated in many different directions.

Polarized light simply means that the electric fields of all waves are aligned and oscillate on the same axis. Light from the Sun can become polarized in many different ways, like when it passes through special Polaroid filters or bounces off the surface of a still lake.

In 1844 Austrian scientist Wilhelm Haidinger discovered that when somebody looks at the source of [polarized light](#) they see a distinctive, colourful shape at the centre of their vision.

Known as Haidinger's brush, the shape looks like a small yellow bow tie crossed with a small blue bow tie. The blue bow tie is aligned with the electric field of the observed light, so this can be used to determine the axis of the light's polarization.

In his article, Shane gives hints and tips for the best way to go about seeing Haidinger's brush – a blue or white background on an LCD computer screen is a handy source – and how it serves as an excellent teaching tool in his physics lessons.

In the accompanying video to this month's issue of *Physics World*, you can test out this "superpower" by [trying to detect Haidinger's brush yourself](#).

Shane also describes the possible explanations for Haidinger's brush, the most recent of which was put forward by a research team led by Albert

Le Floch at the University of Rennes in France.

Le Floch et al. hypothesize that the brush is caused by the interaction of polarized light with a type of photoreceptor, called cones, in the human eye. They believe that the rare blue cones in the eye – which are most sensitive to the blue frequency of light – are distributed in such a way that more of the polarized light entering the eyes can be transmitted onto these blues cones, producing the characteristic blue bow tie in our vision.

Finding a use for this special "superpower" has proved difficult; however, Haidinger's brush always appears in the centre of the vision, so it is possible to use it to correct "lazy eye".

But as we celebrate the properties and applications of [light](#) in 2015 as part of the International Year of Light, Shane declares that this natural talent can be used as a "fun and fascinating piece of physics" that everybody can share.

Provided by Institute of Physics

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