Professor proposes challenge to prove whether people can see entangled images

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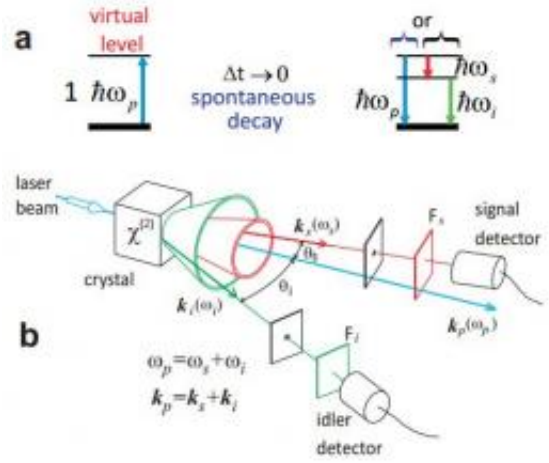

a) Spontaneous parametric down conversion: A photon from a laser beam excites a nonlinear medium (usually a crystal) to a virtual level that decays spontaneously into two possible paths. Either an identical laser photon is created or a pair of photons appear. Their energy adds up to the energy of the laser photon. Photons from all colors (wavelengths) can be obtained. b) The photon pairs follow directions given by linear momentum conservation. F designate an optical interference fi lter. Image: Geraldo A. Barbosa, arXiv:1202.5434v1 [q-bio.NC]

(PhysOrg.com) -- Geraldo Barbosa, professor of electrical engineering and computer science at Northwestern University has posed an interesting challenge. He wonders if the human eye and brain together are capable of actually seeing entangled images. This is not a philosophical question, as he has phrased the query as part of a practical

experiment that someone with the proper lab could actually carry out. To that end, he's posted a paper on the preprint server *arXiv* with the hope that a physics team will take up the challenge.

The whole idea is based on entanglement and the means by which researchers make it come about. What they do is shoot a laser at a non-linear crystal causing the photons in the beam to be converted into lower frequency entangled pairs. Those pairs are then directed to sensors which individually are able to measure a fuzzy or blurred "image". But when both of the entangled photons are taken together as a single measurement, the image sharpens. These images are of course far too small for the human eye to see, plus they don't last long enough for them to be seen anyway. To address these issues, researchers have taken to firing lasers that are formed into patterns such as a doughnut shape in a continuous sequence. The result is a steady stream of entangled pairs being created in the shape of a doughnut.

Barbosa wants to know what would happen if instead of forming a doughnut shape, the lasers were made to look like a letter in the alphabet, such as the letter A, and then of course if it were made large enough to be seen by the human eye. Two entangled letter As should be created and seeable albeit in a lower frequency. If that happened, would the human eye when paired with the brain's abilities, be able to merge the two into a sharp readable image, or would we see just the individual blurred images captured by just one sensor?

Barbosa doesn't know, and neither does anyone else, thus he suggests someone or some group build an experiment to find out.

The ability to see things differently than we are accustomed to seeing isn't anything new of course. Some animals can see things in the infrared spectrum for example and evidence has been slowly emerging as described here, here and here, suggesting that some migrating birds are

able to “see” the Earth’s magnetic field. So maybe it’s possible that we see entangled images every day, and just don’t know it.

Hopefully someone will take Barbosa up on his challenge, and then we’ll all find out if it’s possible or not.

More information: Can humans see beyond intensity images? by Geraldo A. Barbosa, arXiv:1202.5434v1 [q-bio.NC] arxiv.org/abs/1202.5434

Abstract
The human's visual system detect intensity images. Quite interesting, detector systems have shown the existence of different kind of images. Among them, images obtained by two detectors (detector array or spatially scanning detector) capturing signals within short window times may reveal a "hidden" image not contained in either isolated detector: Information on this image depend on the two detectors simultaneously. In general, they are called "high-order" images because they may depend on more than two electric fields. Intensity images depend on the square of magnitude of the light's electric field. Can the human visual sensory system perceive high-order images as well? This paper proposes a way to test this idea. A positive answer could give new insights on the "visual-conscience" machinery, opening a new sensory channel for humans. Applications could be devised, e.g., head position sensing, privacy in communications at visual ranges and many others.

via ArXiv blog

entangled-images.html