Korean researchers making progress on 3D OLED screens

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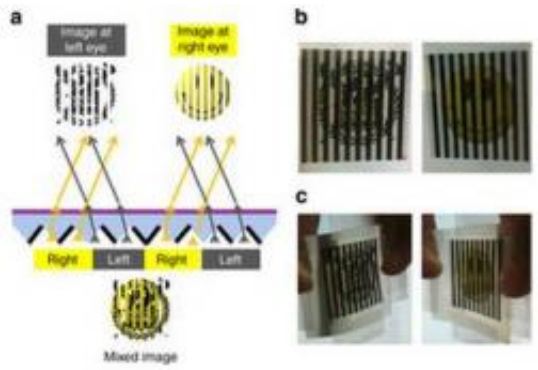

Autostereoscopic 3D display. Image: NPG, doi:10.1038/ncomms1456

(PhysOrg.com) -- With the recent rise in popularity of 3D movies at the theater, consumers quite naturally have begun to wonder about what's being done to bring such technology to their smartphones and better yet, the big flat screen TVs in their living rooms. As it stands now, most viewers that wish to watch 3D movies, whether at home or the theater, must wear some type of 3D eyeglasses. This is unfortunate, because most would prefer to watch without having to don the goofy looking accessories.

Such viewers are likely then to get excited about the new technology that is currently being developed in South Korea. There a team of scientists have figured out a way to use tiny prisms to bend light in optical devices so that different images are shown to each eye, thus producing a 3D

effect. The team, a consortium of scientists from Seoul National University, Act Company and Minuta Technology, have published the results of their research in Nature Communications.

Their idea involves the use of a microscopic sized array of prisms stuck on to a sheet of plastic to facilitate a filtering effect that reflects the light being emitted by the diode below it. The concept works because it doesn't need to be backlit as is done with LCDs. Organic Light Emitting Diodes (OLEDs) instead use organic compounds that light up when a small amount of electricity is applied to them. The prism array, called by the researchers a Lucius prism (Latin for bright) allowed the research team to create a display that showed an image that could only be seen when looked at from a certain angle, meaning that all of the light emitted was directed together in a new direction, a key component in creating a 3D screen. The team also created a screen that displayed two different versions of the same, but slightly altered, image at the same time; one image for the left eye, the other for the right, creating for the viewer the sensation of depth, without the need for special eyeglasses.

The array created by the team is just 4 centimeters square, which is obviously too small for practical use, but the team believes they can scale it up to television size given more research time. And because the team used what amounts to a simple plastic to make the screen, it's possible the final result will be flexible as well, opening the door to the creation of all sorts of new display devices.

More information: Arrays of Lucius microprisms for directional allocation of light and autostereoscopic three-dimensional displays, *Nature Communications* 2, Article number: 455
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Abstract
Directional and asymmetric properties are attractive features in nature

that have proven useful for directional wetting, directional flow of liquids and artificial dry adhesion. Here we demonstrate that an optically asymmetric structure can be exploited to guide light with directionality. The Lucius prism array presented here has two distinct properties: the directional transmission of light and the disproportionation of light intensity. These allow the illumination of objects only in desired directions. Set up as an array, the Lucius prism can function as an autostereoscopic three-dimensional display.

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