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New imaging device could lead to touch-free user interfaces

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Austria: Based on a flat, flexible, transparent, and potentially disposable, polymer sheet which uses fluorescent particles to capture incoming light and channel a portion of it to an array of sensors framing the sheet, a team of scientists from the Johannes Kepler University Linz have developed a new way of capturing images.

Image: Optics Express

With no electronics or internal components, the imager's design makes it ideal for a new breed of imaging technologies, including user interface devices that can respond not to a touch, but merely to a simple gesture.

Co -author of the paper, Professor Oliver Bimber, said: "To our knowledge, we are the first to present an image sensor that is fully transparent – no integrated microstructures, such as circuits – and is flexible and scalable at the same time.

"In CT [X-ray computed tomography] technology, it's impossible to reconstruct an image from a single measurement of X-ray attenuation along one scanning direction alone. With a multiple of these measurements taken at different positions and directions, however, this becomes possible. Our system works in the same way, but where CT uses X-rays, our technique uses visible light."

The main application the researchers envision for this new technology is in touch-free, transparent user interfaces that could seamlessly overlay a television or other display technology. This would give computer operators or video-game players full gesture control without the need for cameras or other external motion-tracking devices.

The polymer sheet could also be wrapped around objects to provide them with sensor capabilities. Since the material is transparent, it is also possible to use multiple layers that each fluoresce at different wavelengths to capture colour images.

The research has been published in the journal *Optics Express*.

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