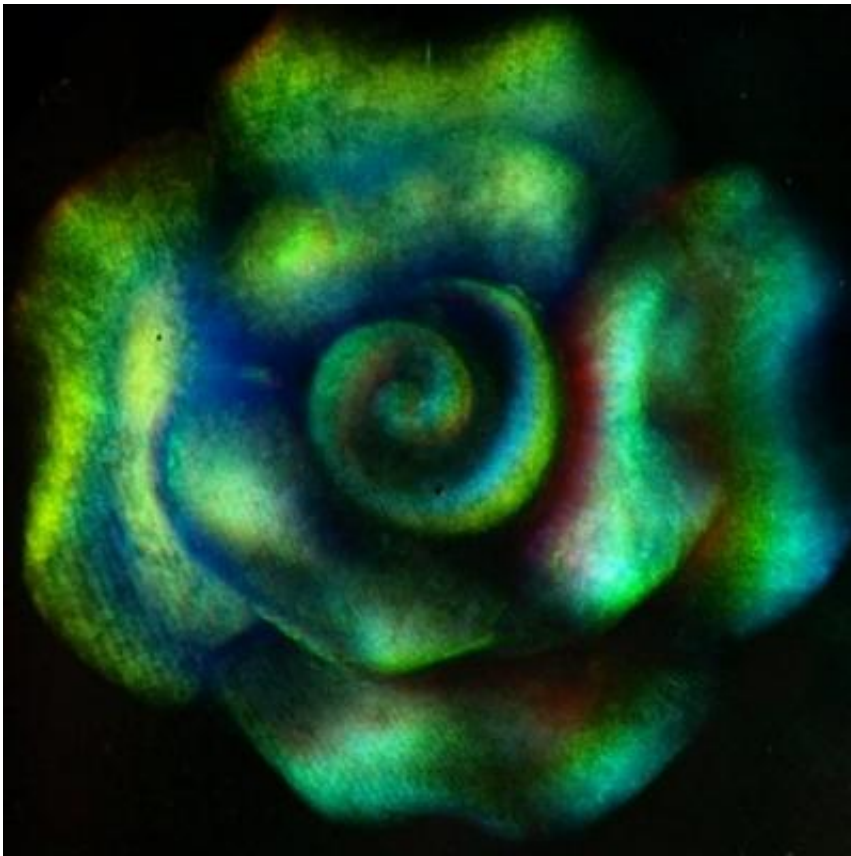


Researchers discover way to create true-color 3-D holograms

April 8 2011, by Bob Yirka



A view of a 3-dimensional green crane reconstructed by white-light illumination.
Credit: Image © Science/AAAS

(PhysOrg.com) -- Satoshi Kawata, Miyu Ozaki and their team of photonics physicists at Osaka University in Japan, have figured out a way to capture the original colors of an object in a still 3-D hologram by

using plasmons (quanta of plasma oscillation) that are created when a silver sheathed material is bathed in simple white light. The discovery marks a new milestone in the development of true 3-D full color holograms. In their paper, published in *Science* magazine, the researchers show a rendered apple in all its natural red and green hues.

Holograms, of course, have been around for years, with the first images created in the 60's. Back then the technique was to fire a laser at an object and then record the patterns of interference in the light waves onto a photo sensitive material. Later, rainbow type holograms (such as those used on credit cards) were, and still are, created by using a technique whereby white light is reflected off a silver backing through a plastic film that contains several different images of a single object.

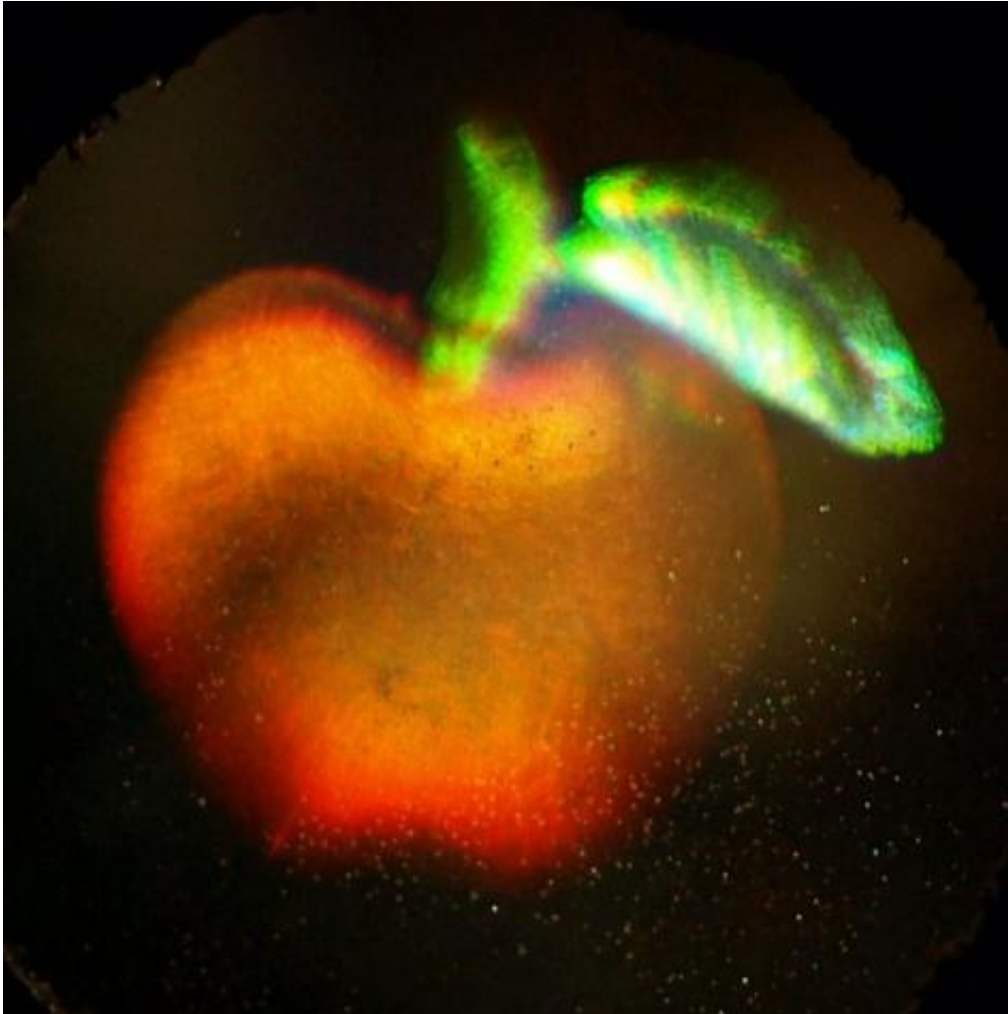


Image (c) Science/AAAS

The team at Osaka took another approach, they use both lasers and white light. They first fire a laser at an object, say an apple, to create an interference pattern, but instead of just one laser color, they actually use three; red, green and blue. The interference pattern is then captured on a light sensitive material which is coated with silver (because it contains electrons that are easily excited by white light) and silicon dioxide (to help steer the waves). They then shine a steady [white light](#) on the metal sheathed material exciting the free electrons, causing the creation of surface plasmons, which results in the regeneration of the captured

image as a true-color 3-D [hologram](#); one that can be viewed from almost any angle and is the same colors as the original object.

Currently, the technique has only been shown to work on still images, and the results displayed on a very small surface area (about as big as a baseball card), but the results of research is nonetheless a very big step towards creating not just more realistic holograms, but true animated 3-D technology.

More information: "Surface-Plasmon Holography with White-Light Illumination," by M. Ozaki et al., *Science* 8 April 2011: Vol. 332 no. 6026 pp. 218-220. [DOI: 10.1126/science.1201045](https://doi.org/10.1126/science.1201045)

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