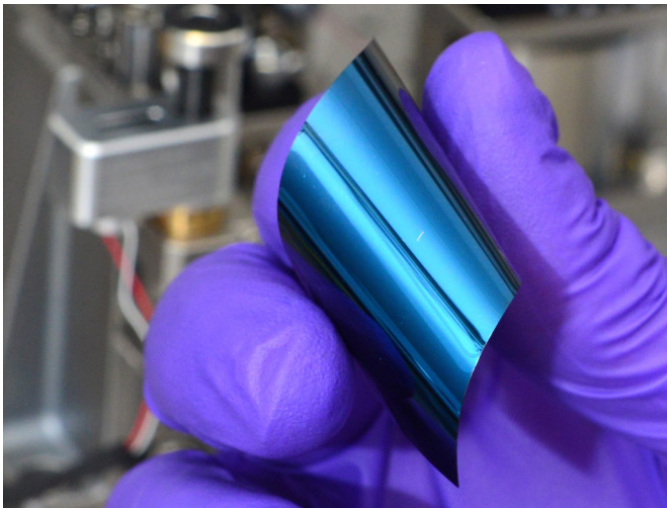


## CD-Making Alloy Key for Future Displays?

Written by Marco Attard  
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One of the alloys found in CDs and DVDs might be key for the thin and flexible displays of the future-- University of Oxford researcher discovered one can "draw" images on a thin layer of GST alloy sandwiched between two transparent electrode layers.



GST (aka  $\text{Ge}_2\text{Sb}_2\text{Te}_5$  or Germanium-Antimony-Tellurium) alloy is a phase change material (PCM), meaning it is able to change between two states with the application of heat, light or electricity. It finds use in rewritable CDs and DVDs, where laser pulses cause it to switch between amorphous and crystalline states.

"We didn't set out to invent a new kind of display," research leader Professor Harish Bhaskaran says. "We were exploring the relationship between the electrical and optical properties of phase change materials and then had the idea of creating this GST "sandwich" made up of layers just a few nanometres thick. We found that not only were we able to create images in the stack but, to our surprise, thinner layers of GST actually gave us better contrast. We also discovered that altering the size of the bottom electrode layer enabled us to change the colour of the image."

According to the researchers tiny PCM stacks can be turned into "nano-pixels" measuring just  $300 \times 300$  nanometers. One can electrically switch these on and off at will to create the building blocks of a high-resolution display technology.

The technology is still at a very early state-- so far it found use in the creation of tiny (smaller than the width of a human hair) two-tone pictures etched using an atomic force microscope. Such images can be created on flexible materials, such as mylar sheets just 200 nanometers

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thick.

"Because the layers that make up our devices can be deposited as thin films they can be incorporated into very thin flexible materials," Bhaskaran continues. "This makes them potentially useful for "smart" glasses, foldable screens, windshield displays, and even synthetic retinas that mimic the abilities of photoreceptor cells in the human eye."

Another potential application for the technology is paper-thin low-power eReader screens able to display both still and moving images.

Currently the PCM displays have around 10 times less contrast than LCD displays, show somewhat washed out colours and feature too few pixels to be actually usable in commercial devices. But the researchers are optimistic the industry will find use for the technology.

Go ["Nano-Pixels" Promise Thin, Flexible, High-Resolution Displays](#)