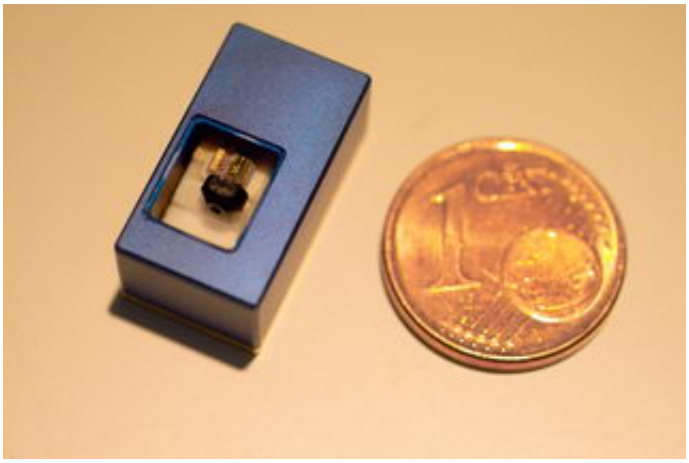
A projector the size of a sugar cube

September 12 2006



This projector gets by with a single mirror instead of a million. As a result, it is small and easily manageable. © Fraunhofer IOF

No larger than a sugar cube, the video projector is ready to hand at all times. Instead of the conventional microarrays, it contains just a single mirror which can be rotated around two axes. This makes it smaller, lighter and handier than traditional.

Cameras, MP3 players and memory chips are growing smaller by the day. The next challenge is to shrink the projector, a device used day in day out in lecture halls and for video presentations.

However, all attempts at miniaturization have so far come up against certain physical boundaries: the core piece of the classic projector is a micromirror array comprising a million mirrors. These can be tilted in

one plane and are evenly illuminated. By turning towards or away from the light source, they produce light or dark pixels that together form the projected image. But not only do the arrays preclude miniaturization, their unaffordable prices also make it difficult for projectors to enter the consumer goods market.

Researchers at the Fraunhofer Institute for Photonic Microsystems IPMS in Dresden and the Fraunhofer Institute for Applied Optics and Precision Engineering IOF in Jena have now come up with an alternative to the previous micromirror arrays. The result is a projector the size of a sugar cube. “We use just one single mirror,” reveals Andreas Bräuer, director of the Microoptic Systems division at IOF. “This mirror can be tilted around two axes.”

The next obstacle in the miniaturization process is the light source. The customary high-pressure lamp will have to give way to small diode lasers if the projector is to shrink to the size of a sugar cube. While red and blue diode lasers are already small enough, green lasers are still too bulky.

Today’s technology allows RGB projectors with a side length of ten by seven by three centimeters to be produced. Although this is still distinctly larger than a sugar cube, it is only a quarter the size of a standard projector. Researchers around the globe are attempting to scale down the green light source. Together with the blue and red diode lasers, it will ideally form the new red-green-blue source. “If green diode lasers are successfully reduced to the size of red ones, then RGB projectors the size of sugar cubes will become a reality,” states Bräuer.

Such would prove useful in many areas. The automotive industry, for example, requires small, cost-effective laser arrays to act as distance sensors that measure the gap between the car and the nearest object when parking. Sensors of this type are also used in robotics and

installation technology. Yet another area of usage for the mini-lasers are digital projectors, which can be integrated in mobile devices such as laptops or PDAs.

Source: Fraunhofer-Gesellschaft