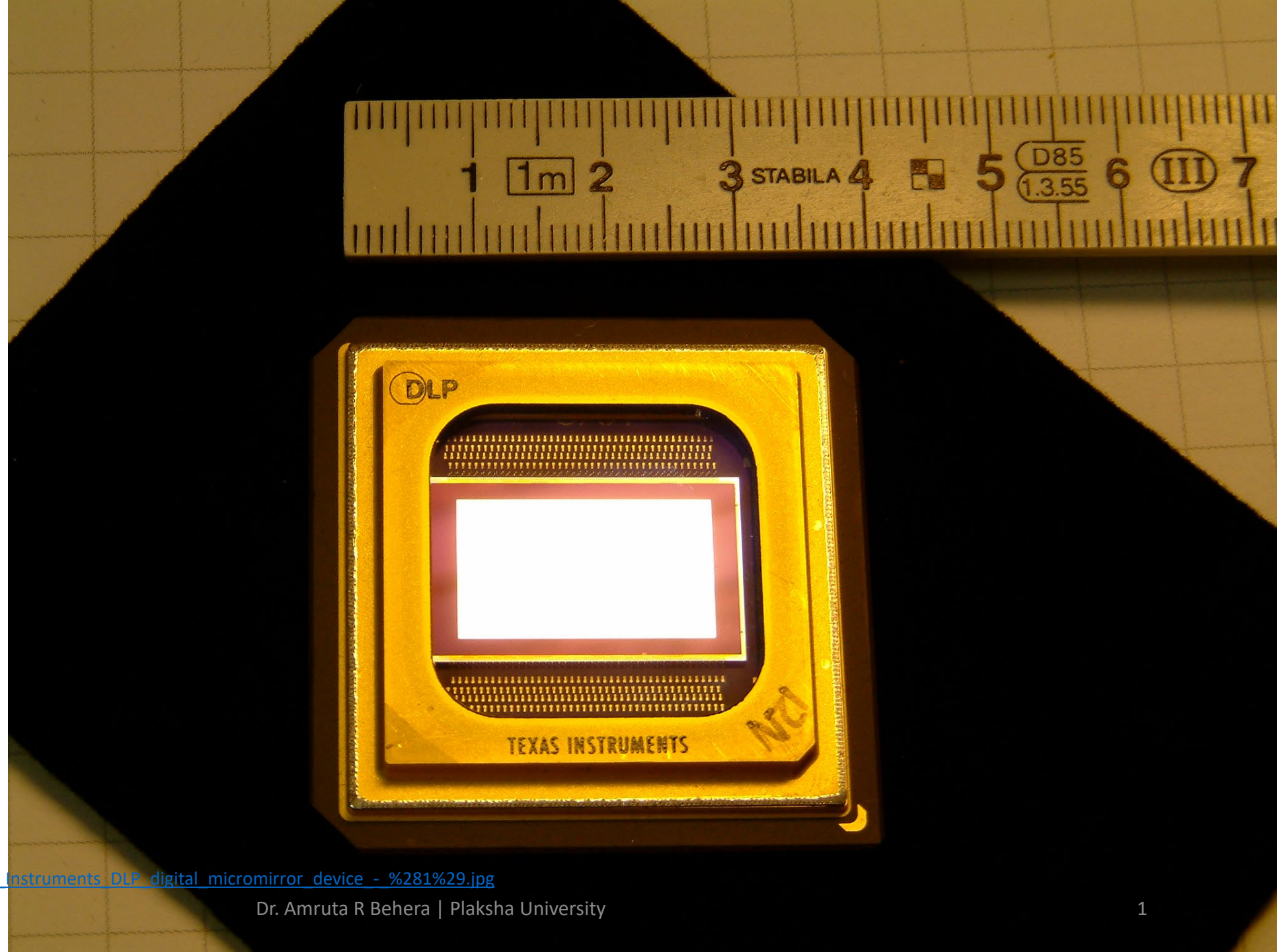


Case Study

DLP Chip

https://commons.wikimedia.org/wiki/File:Texas_Instruments_DLP_digital_micromirror_device_-_%281%29.jpg





Larry Hornbeck shows off his Oscar-winning technology at the Academy of Motion Picture Arts and Sciences' Scientific and Technical Achievement Awards (OSCAR)

<https://spectrum.ieee.org/the-oscar-goes-to-engineer-larry-hornbeck-and-his-digital-micromirrors>

Its development began in 1977 with the forming of a small team at Texas Instruments headed by noted physicist Larry Hornbeck.

1987, the first device was created at TI

1991, patent was granted to Hornbeck

ASME Mechanical Engineering Historic Landmark: 2008



<https://www.asme.org/about-asme/engineering-history/landmarks/243-digital-micromirror-device>

1987

Dr. Larry Hornbeck invents digital micromirror device (DMD), known as the DLP® chip



1996

First commercial DLP system ships; enables first ultra portable projector



1998

DLP Products receives first Emmy® Award for Outstanding Achievement in Engineering Development



1999

Star Wars: Episode 1 – The Phantom Menace shown on DLP Digital Cinema



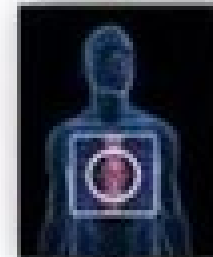
2009

Consumer devices begin to ship worldwide featuring DLP Pico™ technology based projectors



2012

New DLP development kit launches allowing developers to use DLP technology in new markets



2015

Dr. Hornbeck receives the 2014 Scientific and Technical Academy Award® of Merit (Oscar® statuette) for the invention of DMD technology as used in DLP Cinema® projection
Photo credit: Michael Yada / G.A.M.P.A.S.



2017

Lincoln Continental, first automobile with DLP technology-based HUD, comes to market

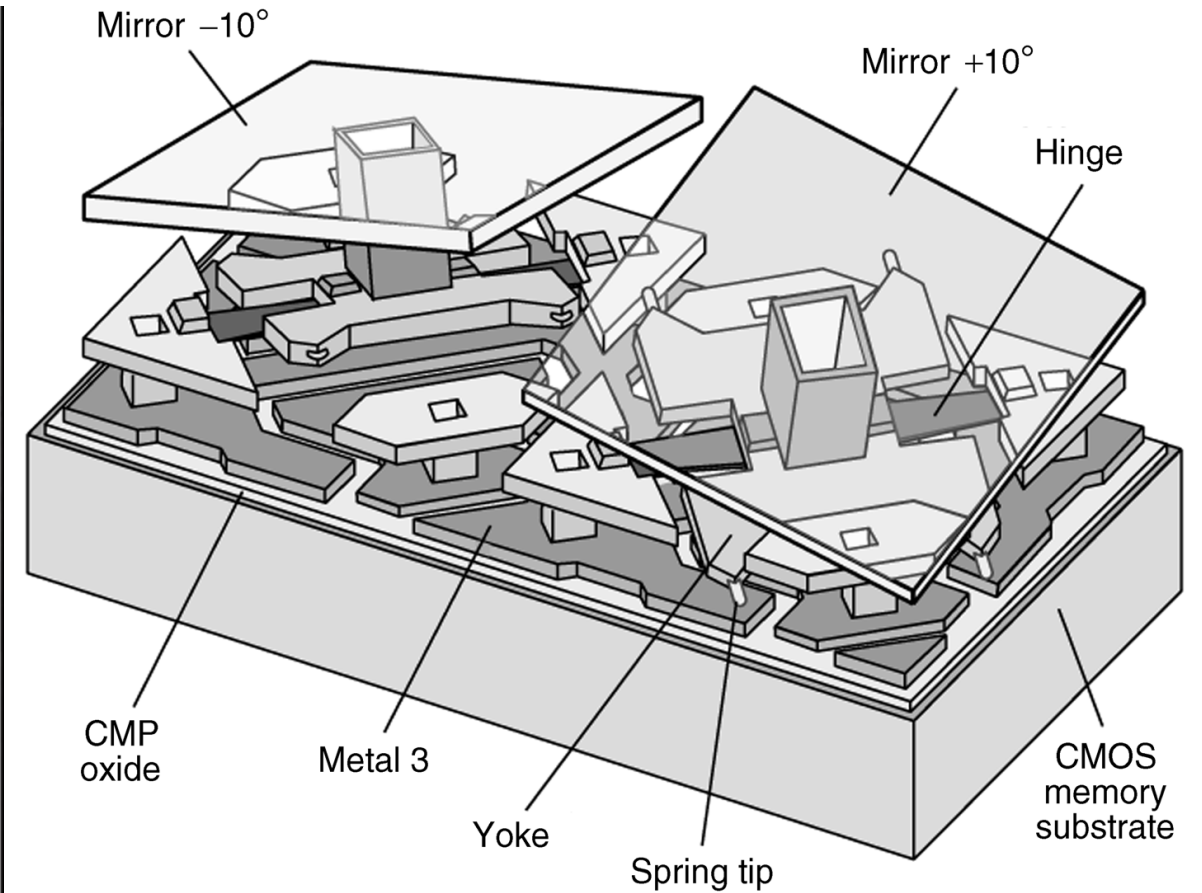
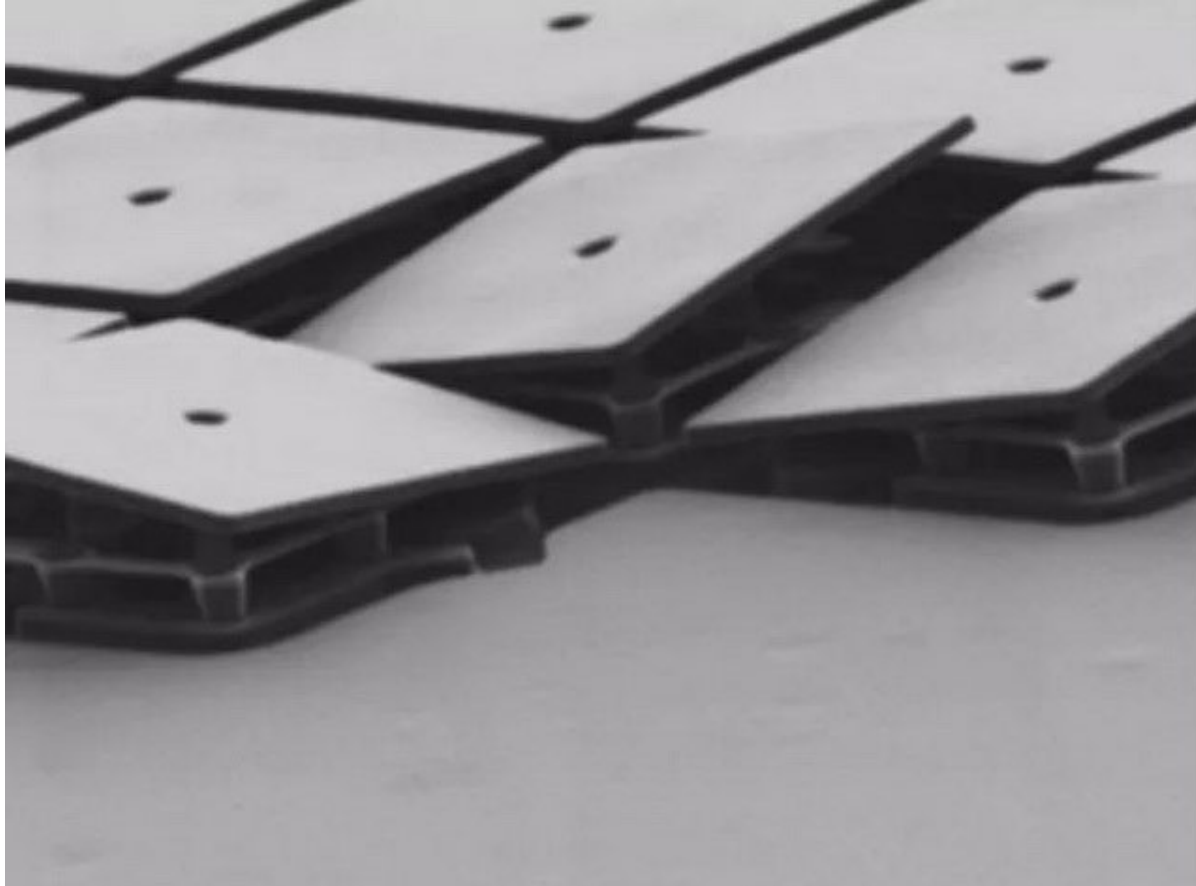


First 4K UHD projector with MSRP < \$2000 with DLP 4K UHD chipset

First automotive-qualified DLP chipset for head-up display (HUD) applications



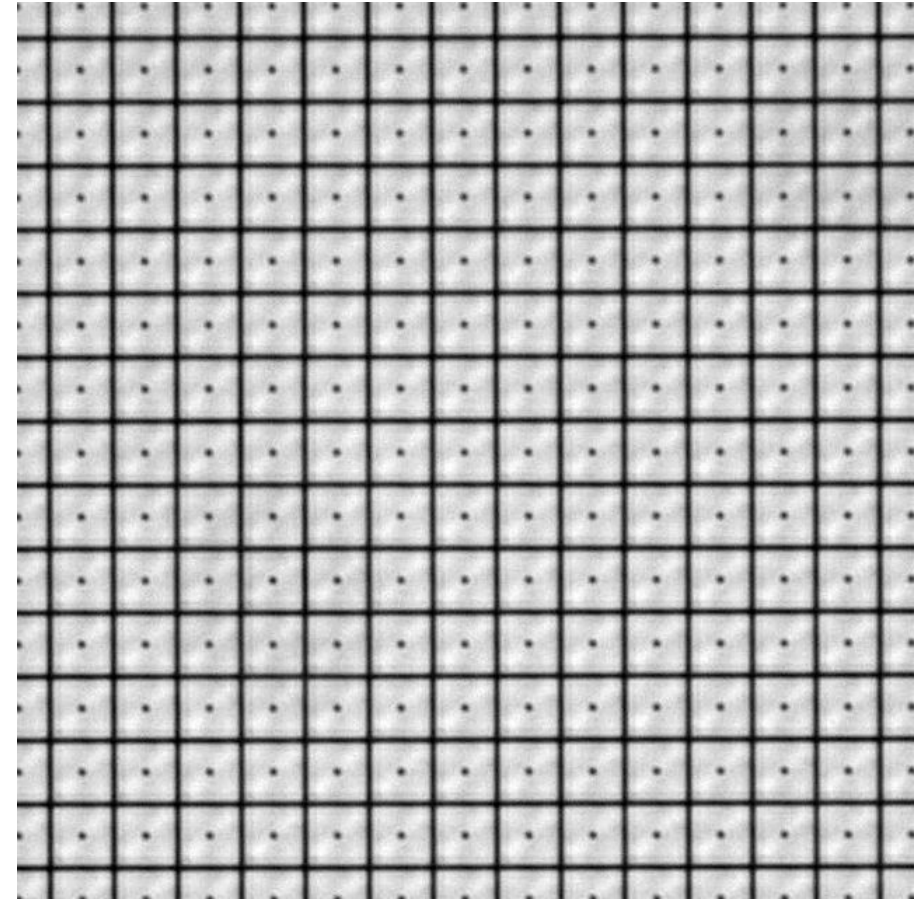
For more than two decades, award-winning DLP Product innovations have solved some of the world's most complex display and light control applications.



<http://www.eviewtek.com/en/a/news/jishuluntan/2020/1111/88.html>
www.mrs.org/publications/bulletin : MRS BULLETIN/APRIL 2001

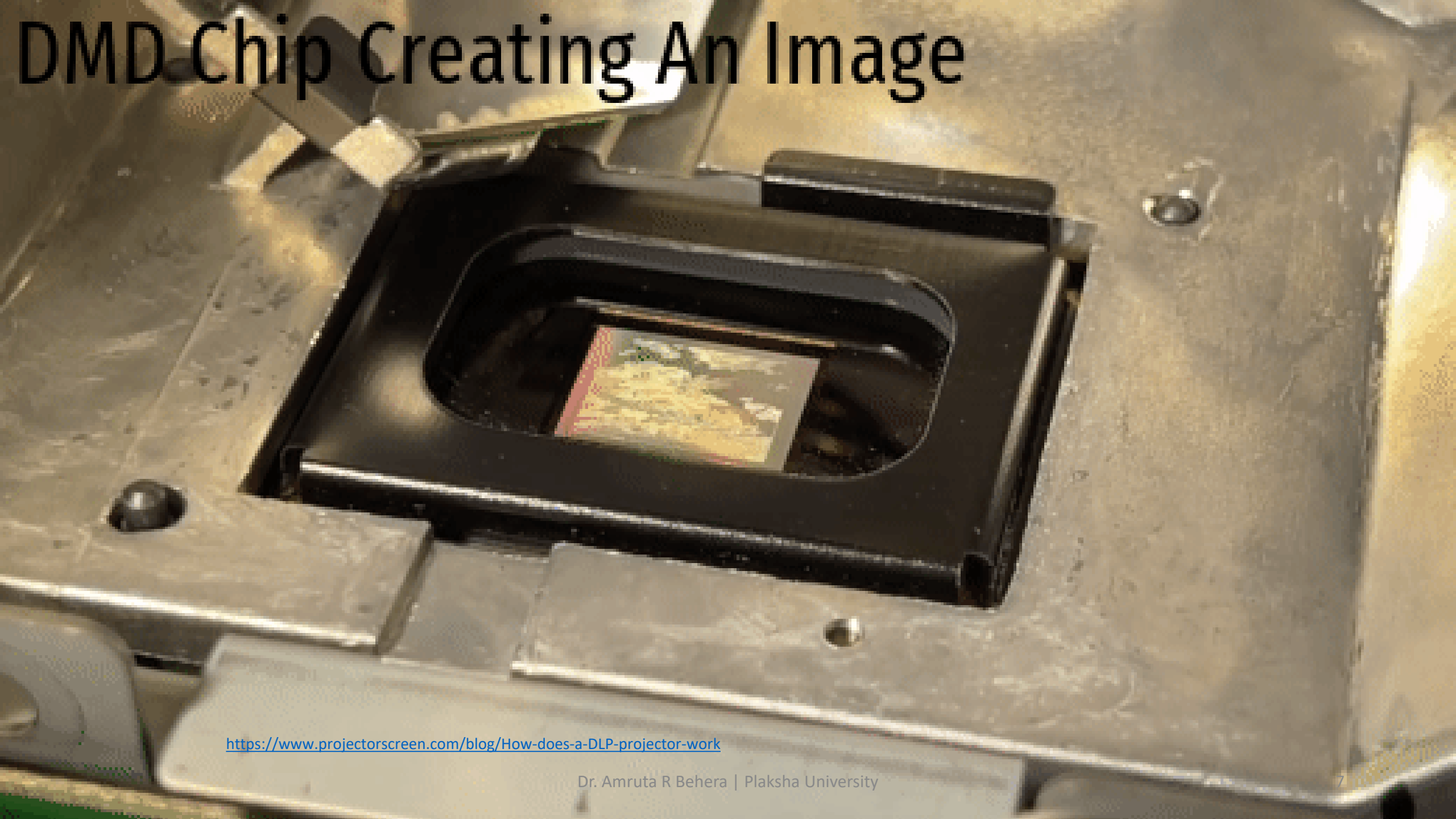
Functional overview

- Array of tiny mirrors (up to 2 million)
- Each mirror is $16\mu\text{m} \times 16\mu\text{m}$ - corresponds to one pixel of projected image
- Each mirror pivots about a fixed axis - $+10$ to -10 Deg, total 20 Deg
- Each mirror acts as a digital light switch - Switching time $<10\mu\text{Sec}$
- ON Light is reflected to desired target
- OFF Light is deflected away from target
- MEMS fabrication process similar to CMOS



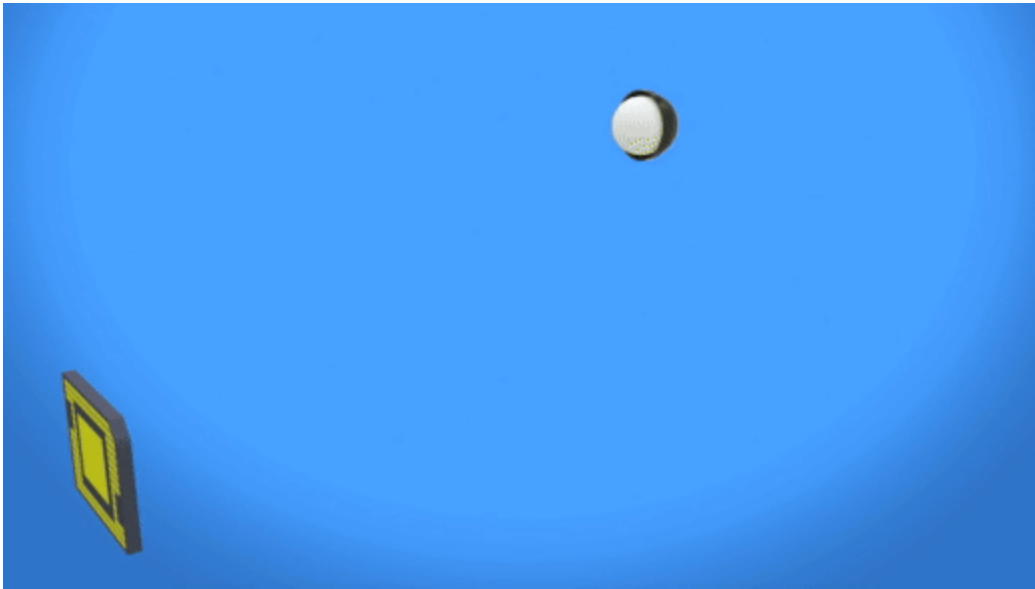
https://www.powershow.com/view/3afa02-YjgwY/Digital_Micromirror_Devices_DMD_powerpoint_ppt_presentation
<https://slideplayer.com/slide/1592835/>
<https://www.projectorscreen.com/blog/How-does-a-DLP-projector-work>

DMD Chip Creating An Image

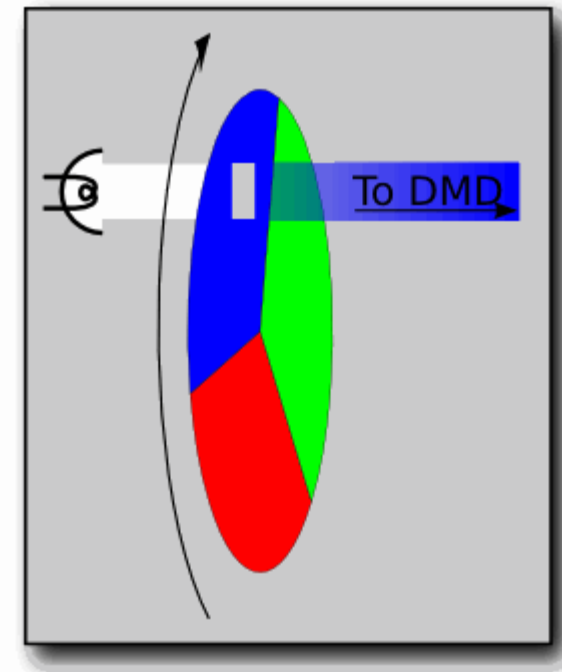


<https://www.projectorscreen.com/blog/How-does-a-DLP-projector-work>

Working of a DLP Projector

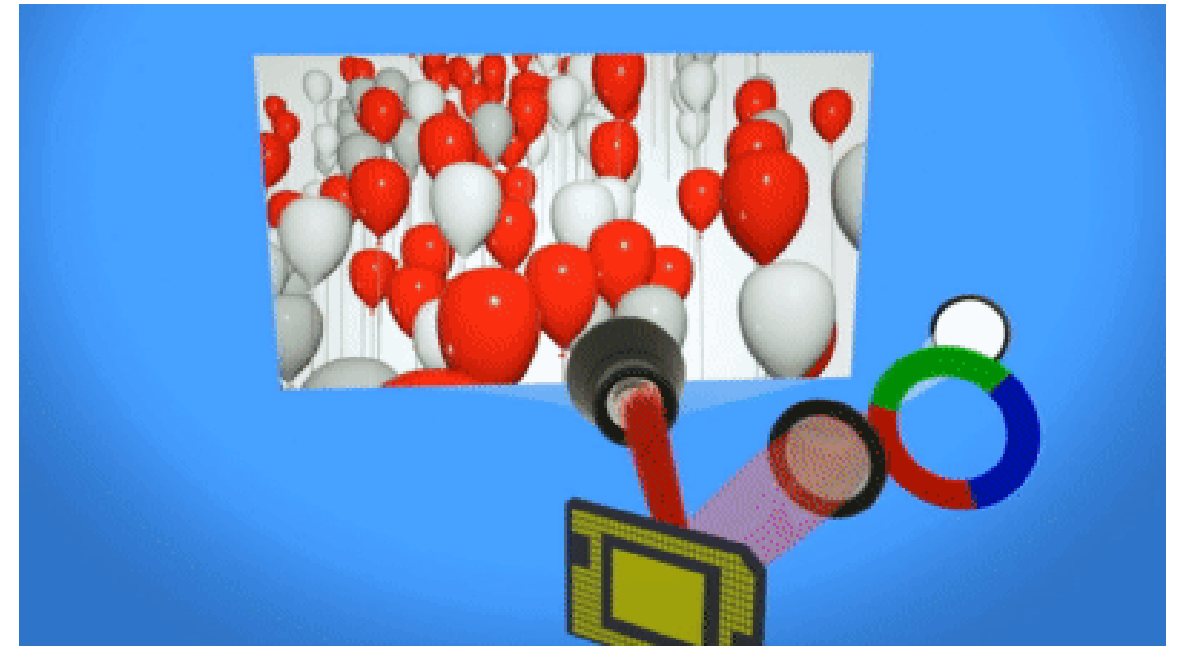
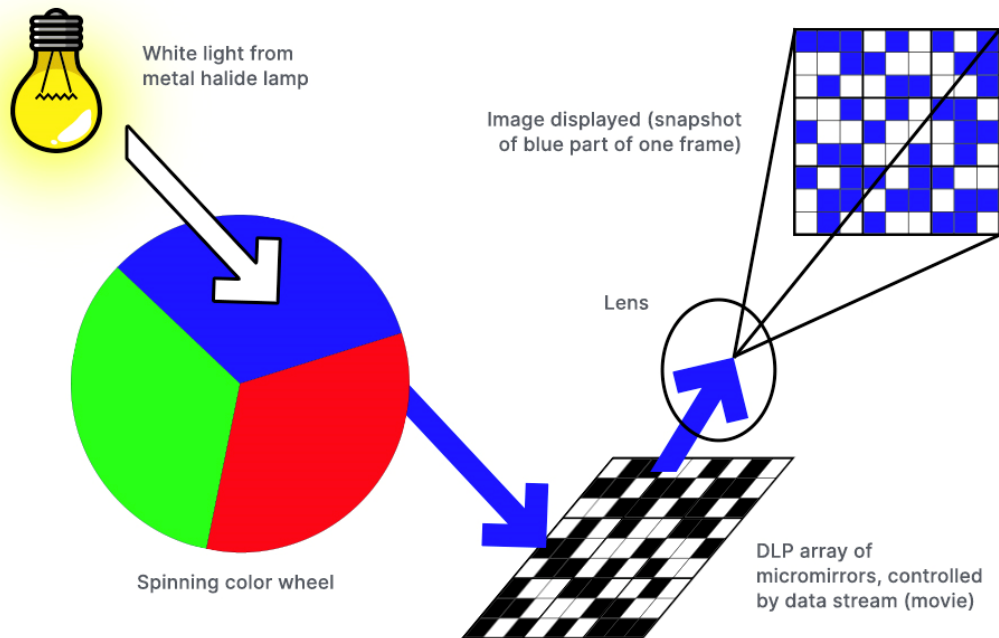


<https://www.projectorscreen.com/blog/How-does-a-DLP-projector-work>



Working of a DLP Projector

Single DLP Color Wheel Projector



<https://www.projectorscreen.com/blog/How-does-a-DLP-projector-work>