Introduction of Emissive Projection Display and Fluorescent film

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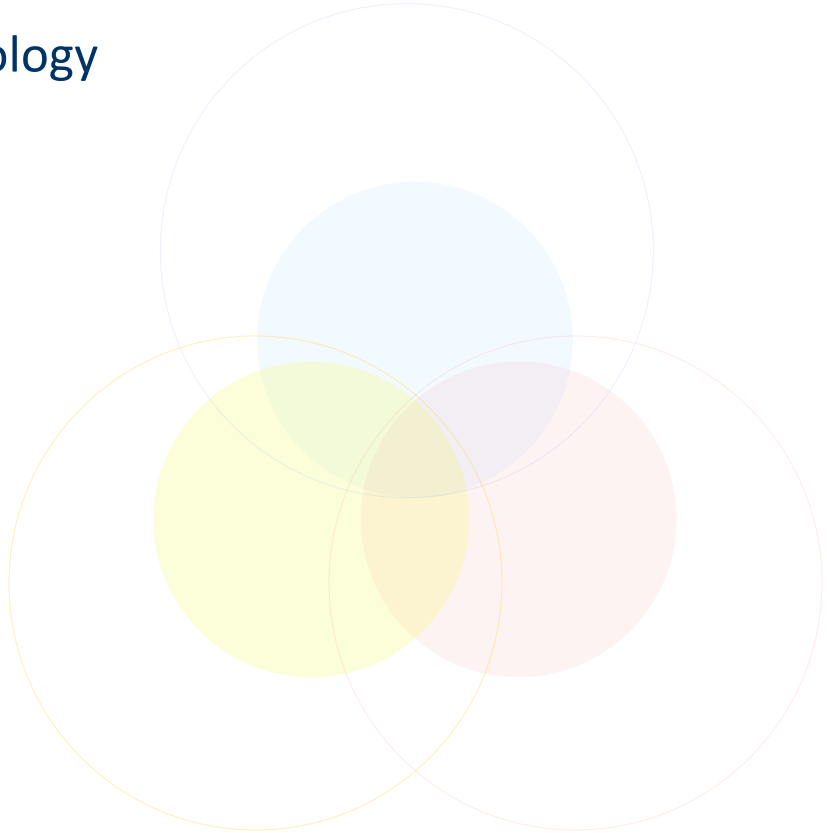
SUN INNOVATIONS

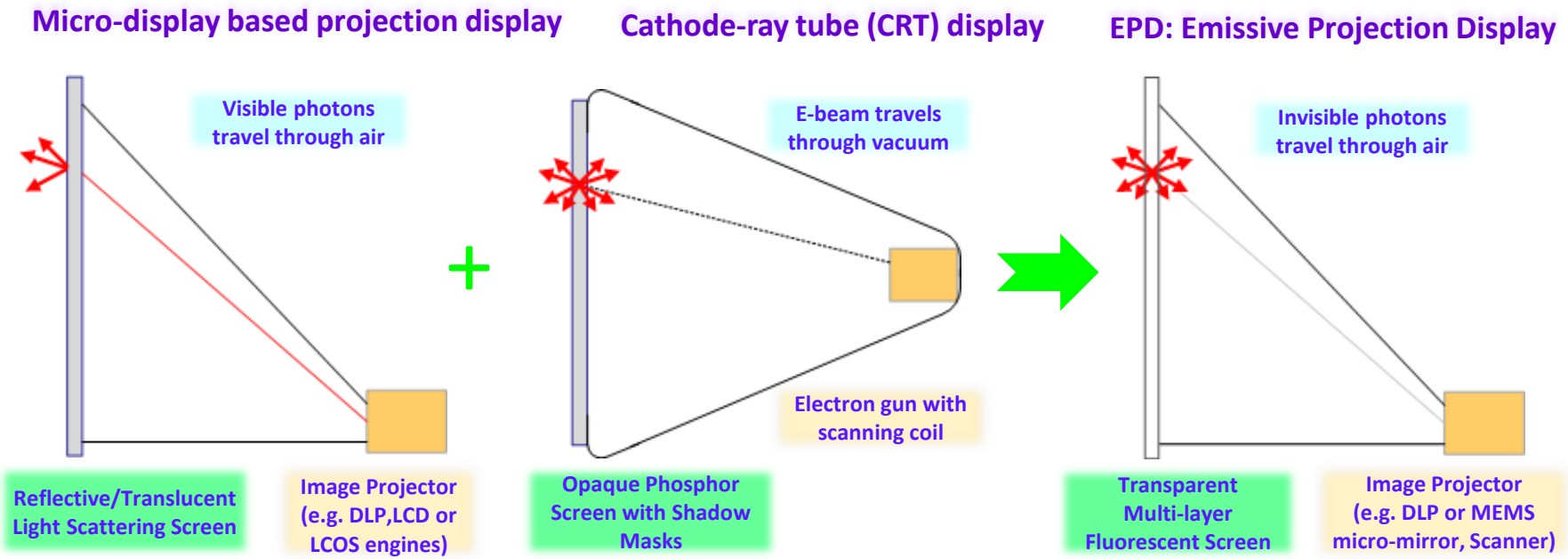
Outline

- Emissive Projection Display technology
- Fluorescent display film
- Application
- Discussion



EPD technology

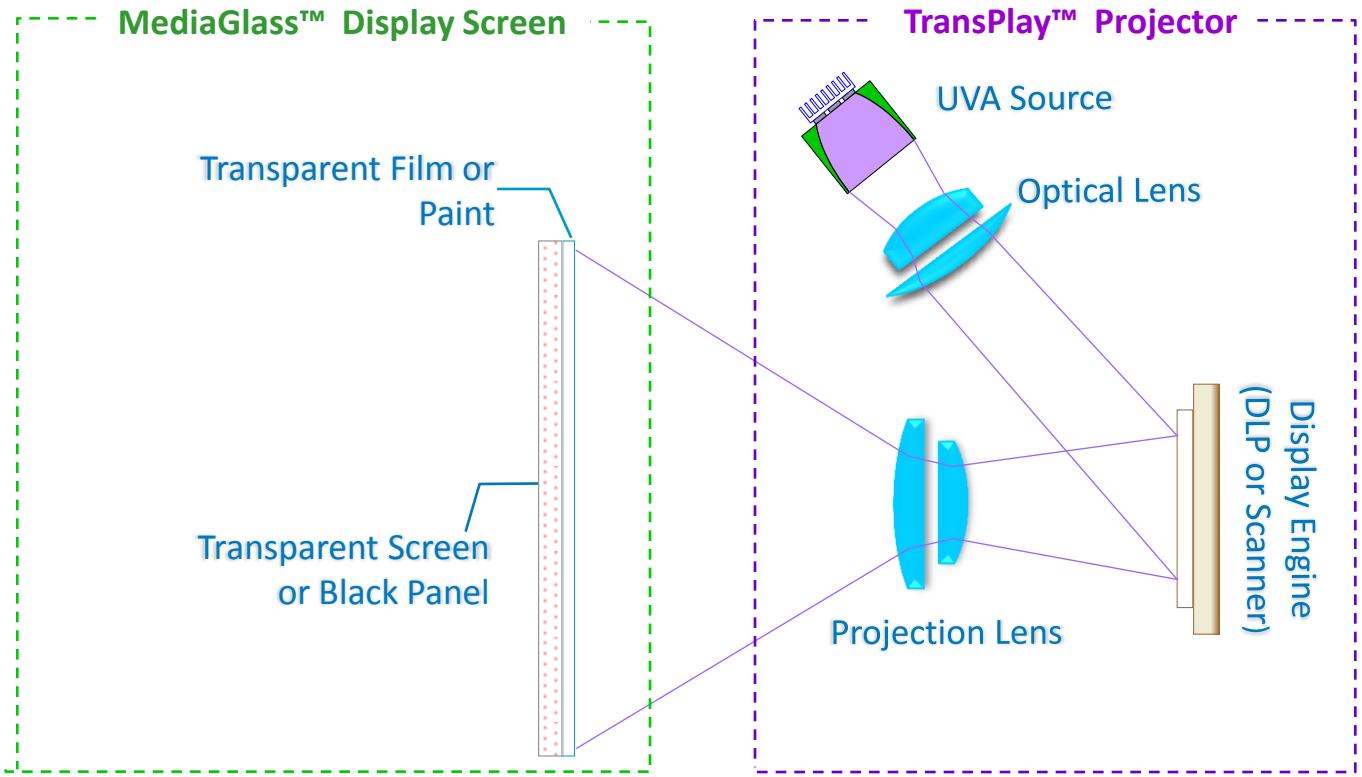
- EPD (**E**missive **P**rojection **D**isplay) is based on a projection-based fluorescent display technology.
- The major difference among the three technologies is that the EPD can display images on either totally clear or opaque substrates; while others are limited to opaque or translucent (scatter or diffusive) screens.



the comparison of the three technologies

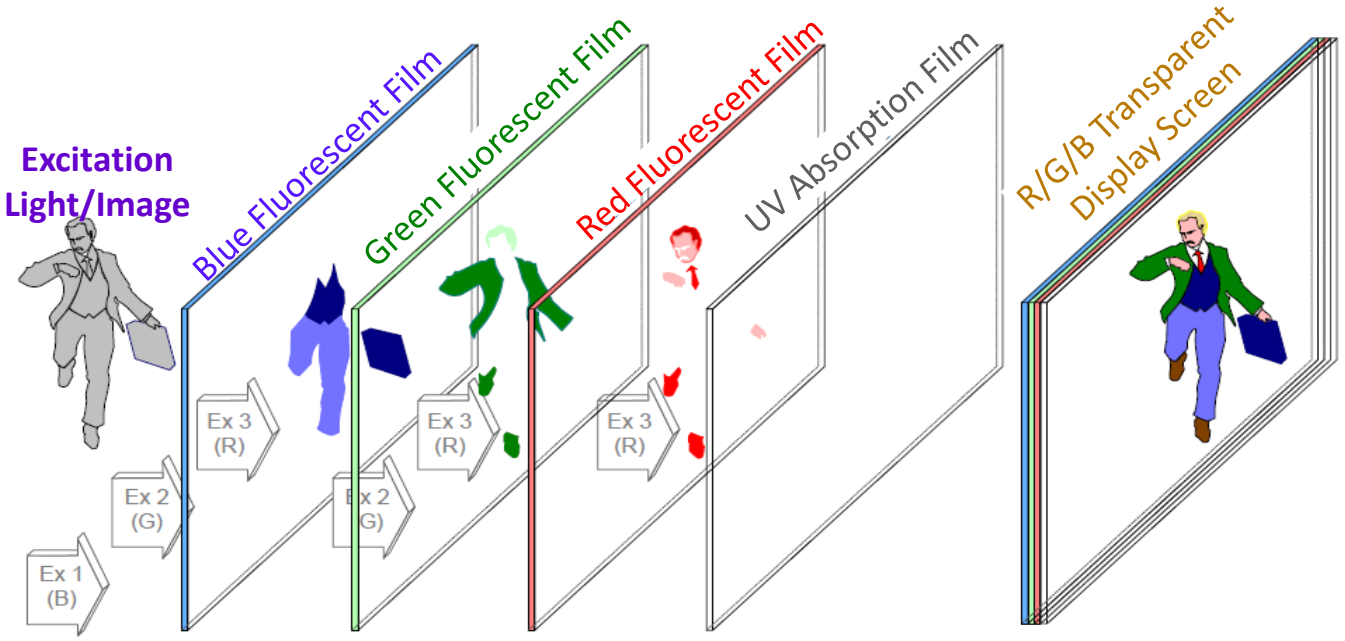
EPD system architecture

- The following diagram demonstrates the working principle of the EPD display system.
- EPD system is comprised of two complementary components: MediaGlass™ and TransPlay™. The TransPlay™ projects images onto glass coated with MediaGlass™ to create vivid, full color transparent displays on either plain, transparent glass or truly black screens.

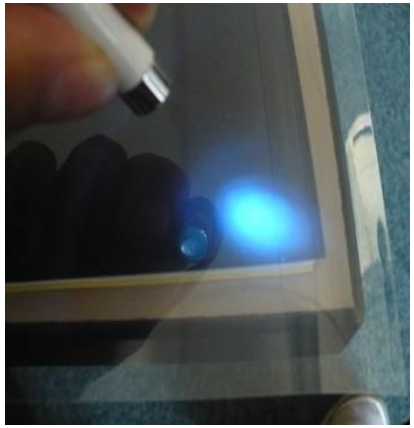


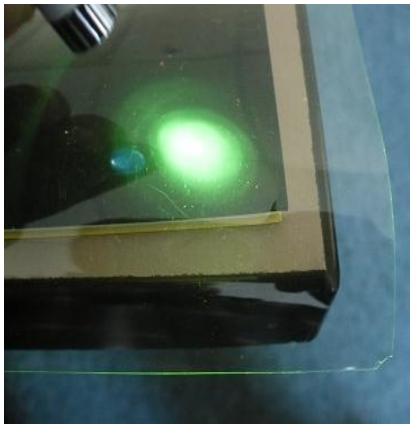
Color image in EPD

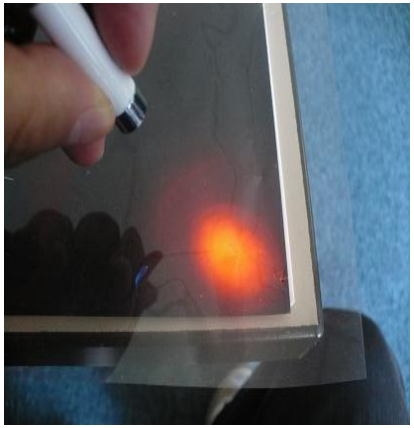
- To display multiple or full-color images, the transparent fluorescent screen can be constructed by stacking films (e.g. red, green and blue fluorescent films) with distinctive absorption and emission characteristics.
- The projector encodes the original color image into the projected light at several excitation wavebands.
- On the screen, lights of each waveband will excite its corresponding film and generate color emissions at visible wavebands (e.g. R, G, and B).

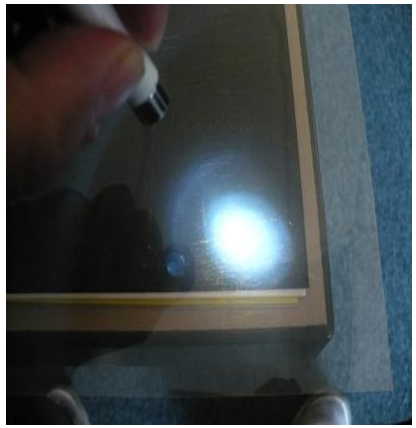


RGB fluorescent film

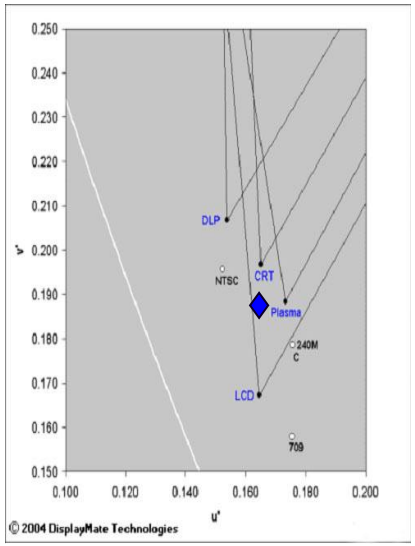


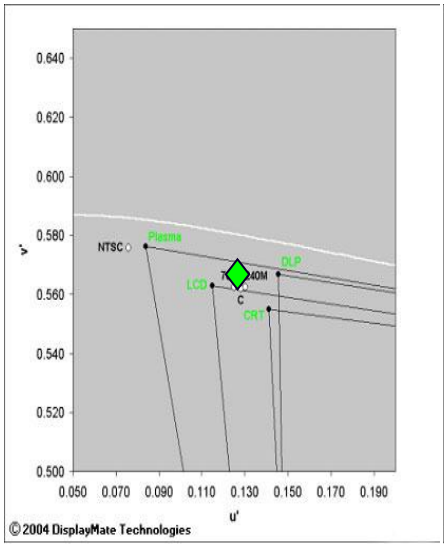


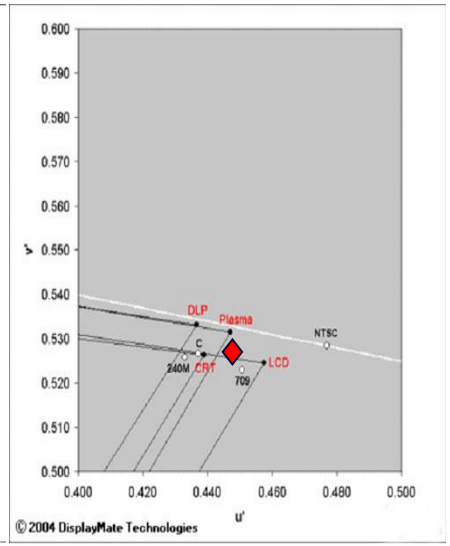


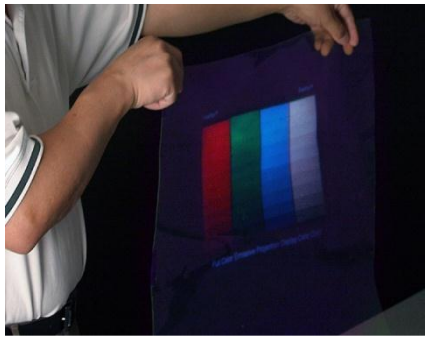


White in fluorescent film





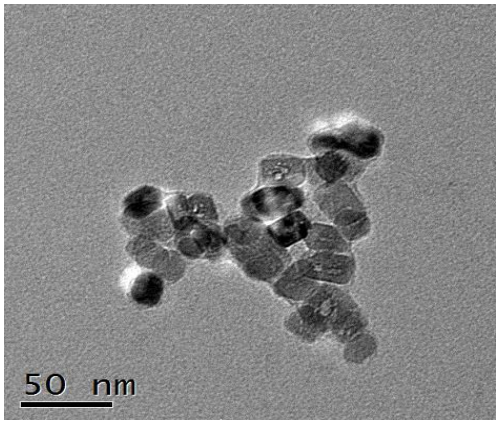


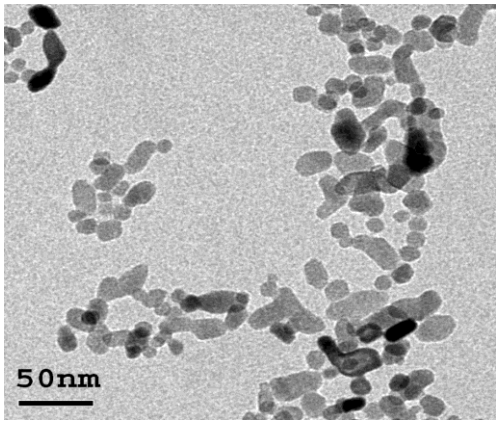


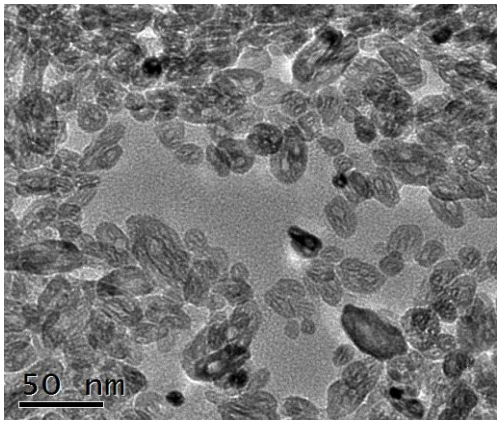
Transparent RGB full-color screen

Water-clear fluorescent film/screen

- Nano-particles with size between 0.5nm to 500nm are preferred to have minimum scattering effect that reduce the visible transparency of the screen.

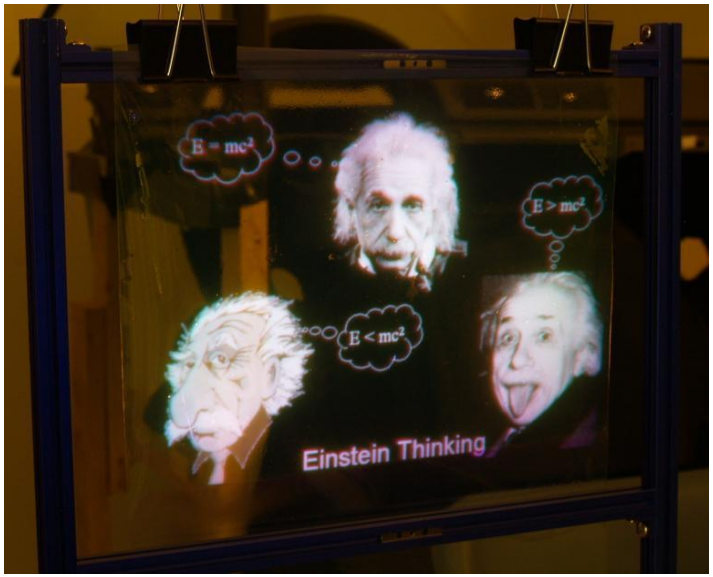




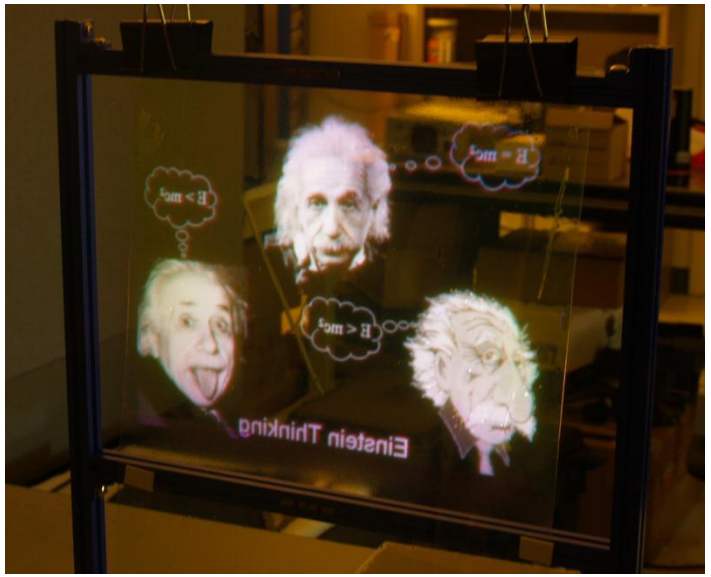


Ultra wide viewing angle; No projection light leak through

- The viewing angle is very large due to the nature of the emissive display screen, the re-emission on the screen is approximate lambertian source.
- On a transparent substrate, images of the same quality can be viewed a full 360 degrees around the image plane.
- Equally bright display on both sides of the crystal-clear projection screen at any angle.
- Projected excitation light is fully absorbed by fluorescent screen, no light leak through.



Einstein(Front side)



Einstein(back side)

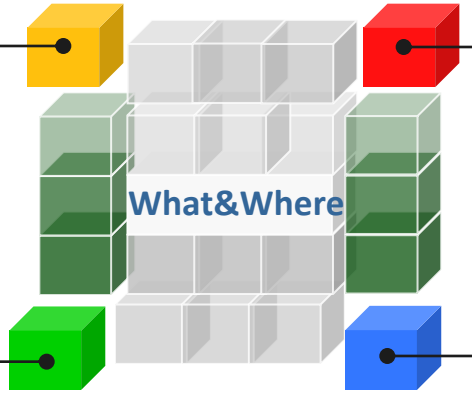
Intellectual Property

- More than 8 US patents regarding emission projection display have been issued.
- The core technology is fully protected by a number of fundamental patents in the following areas:
  - Fundamental concept of rendering full color, projected image and video on transparent fluorescent screen.
  - Fluorescent/phosphoric material family used for transparent, emissive display screen.
  - Black screen and its applications.
  - Projection display systems and theirs applications (include automobile, commercial advertisement and TV).
  - Static signage with transparent fluorescent screen and its applications.

US6986581, US7090355, US0231652, US0231692, US0227694, US0232826, US0094109, US0094266

Application (1) ——Advertising and Digital signage

- Advertising
- Brand promotion
- Information display
- Product launch
- ……



- Storefront window
- In-store exhibition
- Tradeshow display
- Exhibition center
- ……

Application (2) ——Head Up Display

- In the transportation market, EPD technology offers automobile manufactures the ability to use the FWD to transmit information to the driver such as instrument information, GPS, alarm, collision detection, etc.

- Full windshield display capability.
- Unlimited viewing angles.
- Laser generated image, always in focus on windshield.
- Emissive image, no laser Speckle.
- Crystal clear screen.
- Miniature-projector, large display.

Media report about “Smart Windshield”

gcerie.com | Erie Times-News

CNN.com

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IdahoStatesman.com
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Bodies/Chassis

GM researches smart windshield
2008-09-04 15:54 GMT

Fog :

MI, are working on an enhanced vision system. Various elements, including patent-pending from California-based **SuperImaging**, can effectively highlight on the windshield the road's e

engadget

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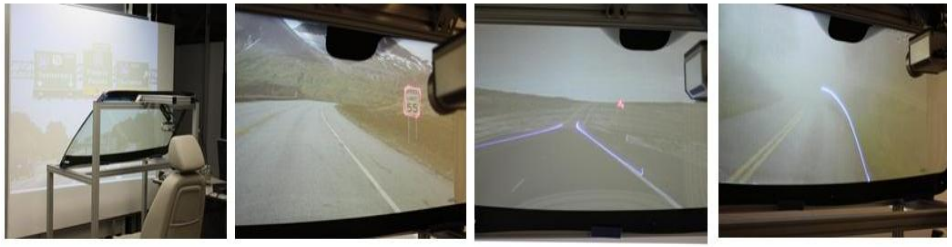
FILED UNDER *Displays, Transportation*

GM shows off sensor-laden windshield, new heads-up display prototype

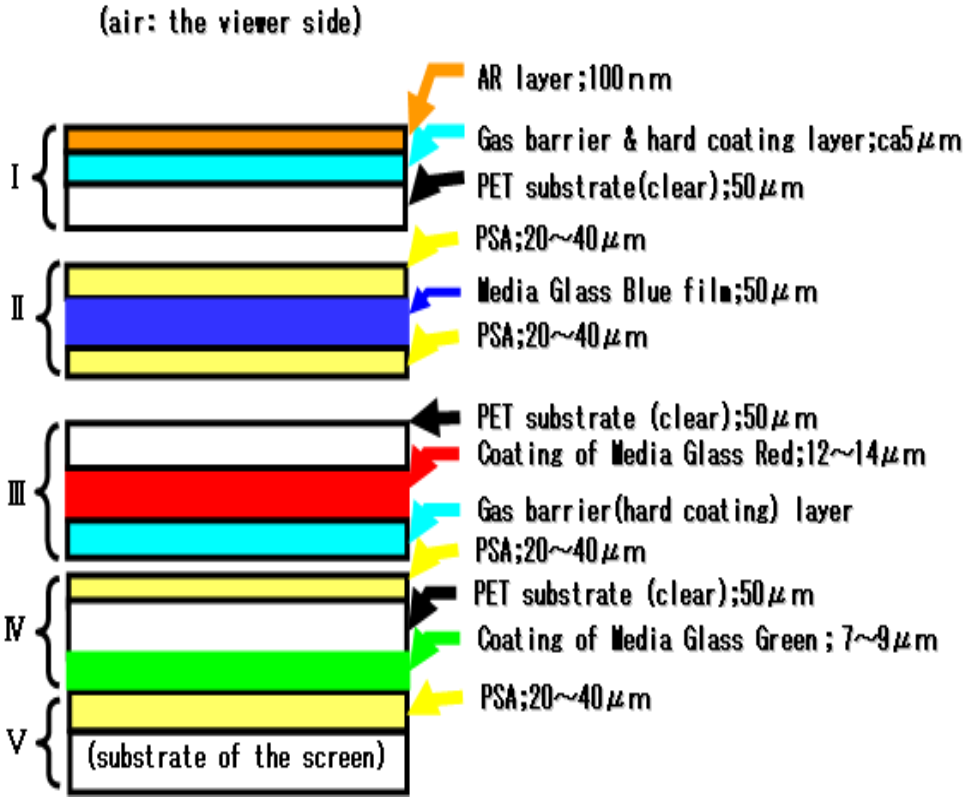
By Darren Murph posted Mar 18th 2010 4:40AM



Heads-up displays are undoubtedly novel, and downright useful in the right circumstances. Trouble is, few of these prototypes ever make it beyond the lab, and we're stuck using these same two eyeballs to experience the world around us. General Motors is evidently tired of the almosts, and it's now working concert with Carnegie Mellon University and the University of Southern California in order to concoct one of the most advanced HUD systems that we've seen -- particularly in the automotive world. Setting out to create "enhanced vision systems," GM's R&D team has

Application (3) ——Black screen HDTV

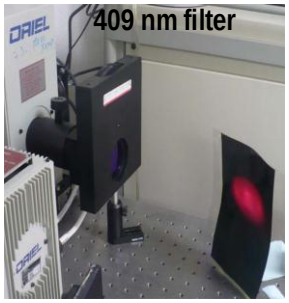
- Based on the fluorescent display on black screen technology that actively battles the impact of ambient light, it will significantly improve contrast ratio in the final image under ambient light conditions.

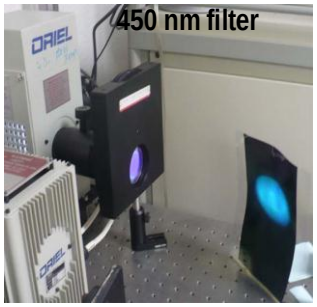


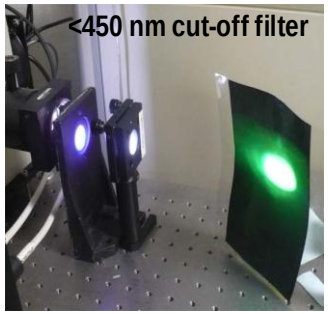
Ultrathin black screen

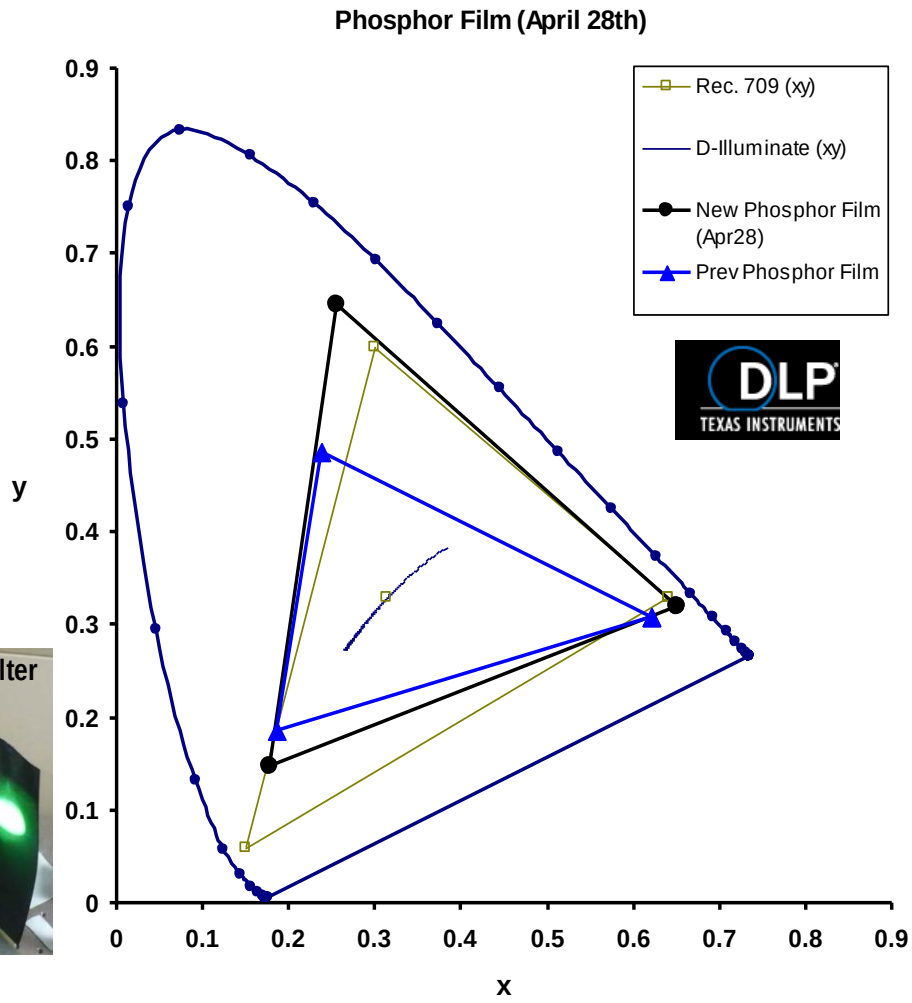
Color gamut of 3rd generation black screen

- The 3rd generation color gamut is more than 95% (Rec709).
- Data provided by TI :







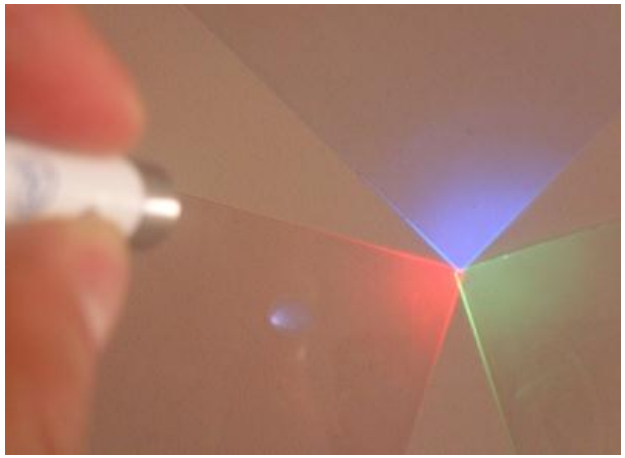


Application cases:

1. Product Launch in World-Expo 2010 (Shanghai)
2. Exhibition hall
3. Suzhou local taxation bureau
4. Show window of fitment store

2011 R&D 100 Award Winner

- Sun Innovations' "***transparent emissive projection display***" technology and product was just selected a winner of the prestigious 2011's "R&D 100 Award".



ABC news on July 3 2011

- ABC report about “Sci-fi glass displays become reality”.
  http://abclocal.go.com/kgo/story?section=news/drive_to_discover&id=8229532

Discussion and Thanks