

DOCKET

07-AAER-3

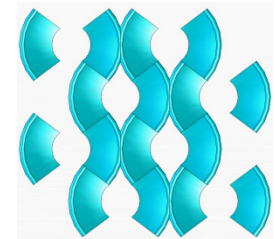
DATE

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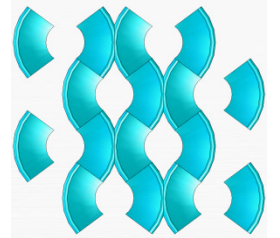
Imagine Designs, Inc.

Next Generation of TVs

June 2009



Introduction



- Imagine Designs has invented and is developing two new optics technologies:

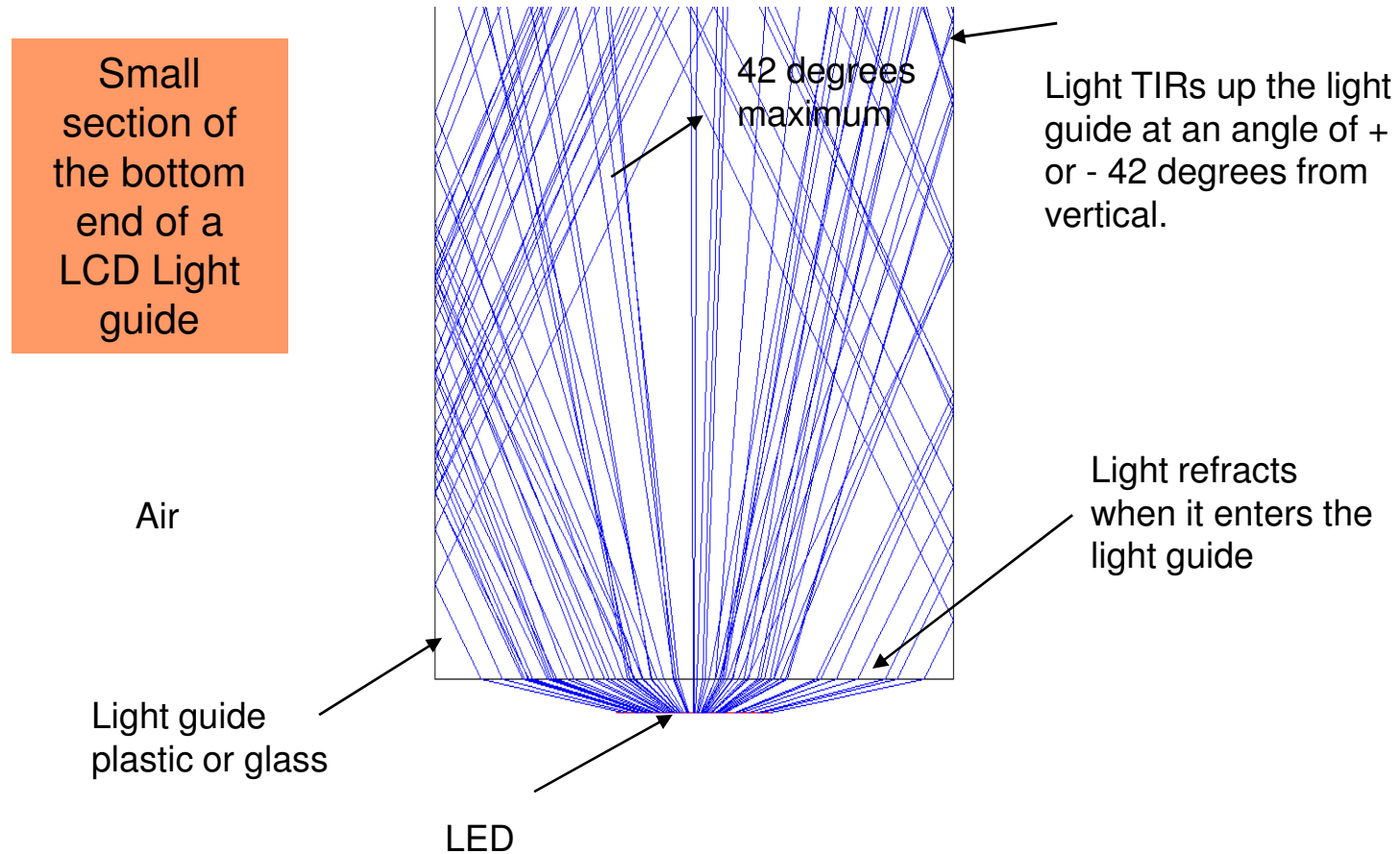
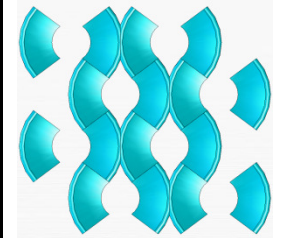
Flat Panel Reflector, FPR optics

Total Internal Reflection, TIR light valve

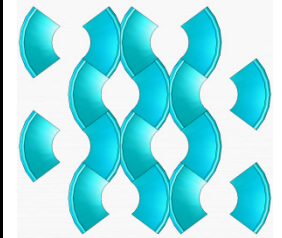
- The combination of these in a display, IDD

Current Light Guide Optics for LCD, reference

Zemax software ray trace

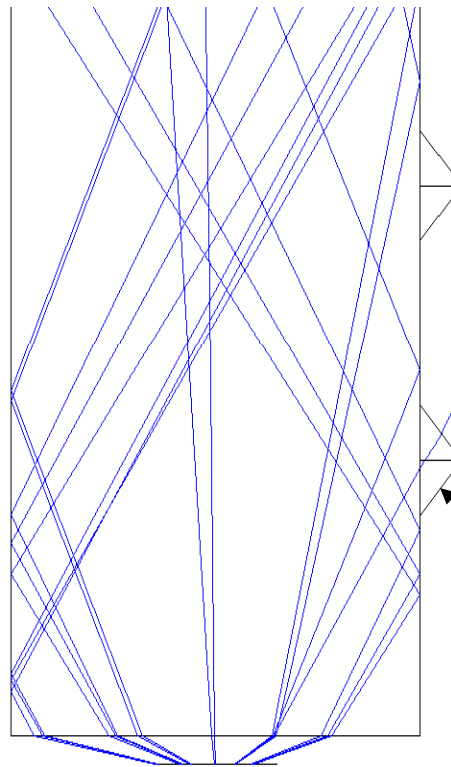


Current Light Guide Optics for LCD, reference



Zemax software ray trace

Bottom end
of LCD Light
guide

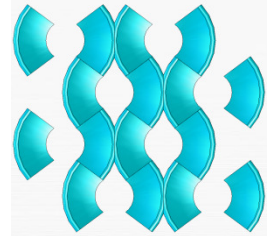
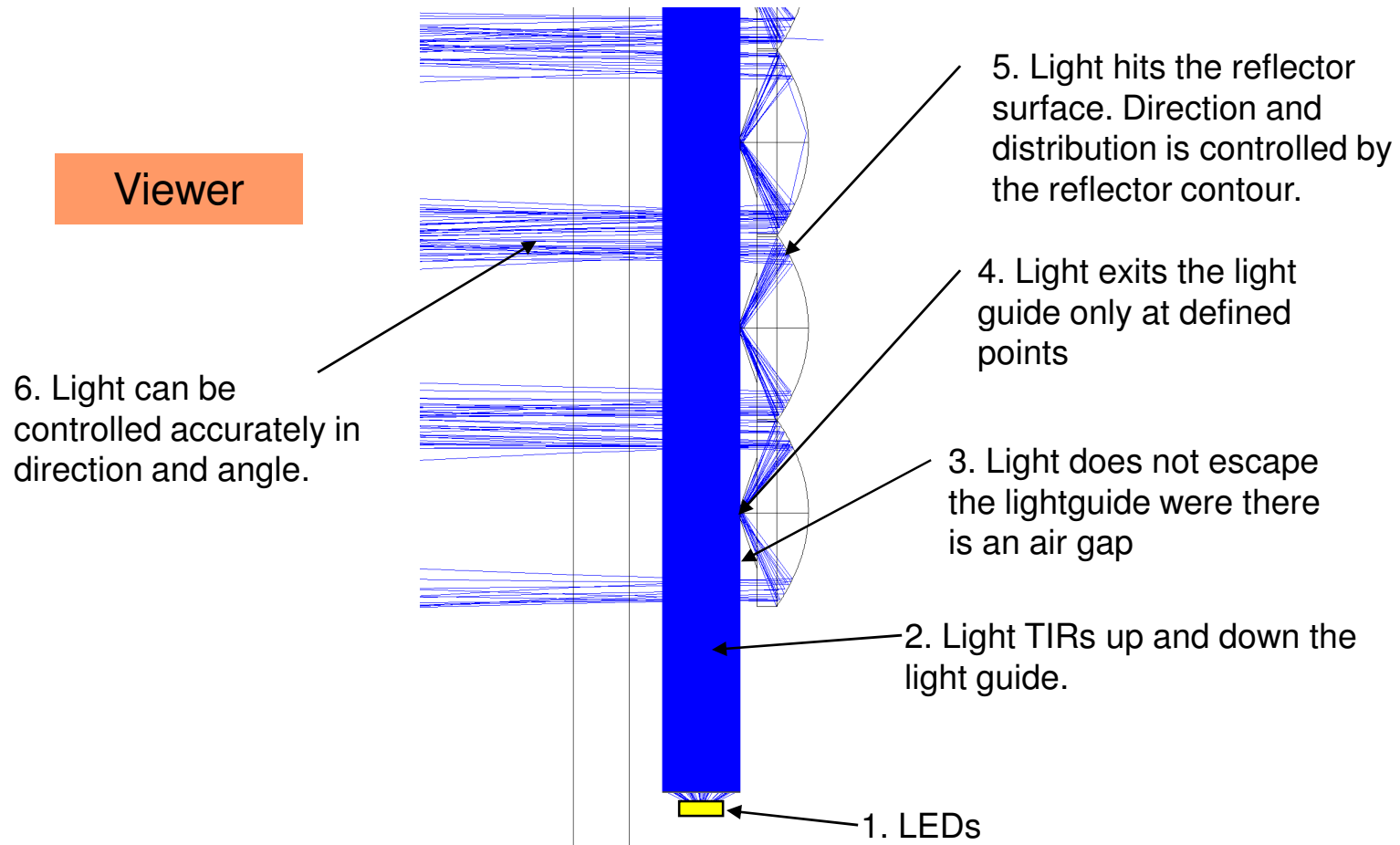


Light escapes
vertically. 3M's BEF
films helps redirect
the light to the viewer.

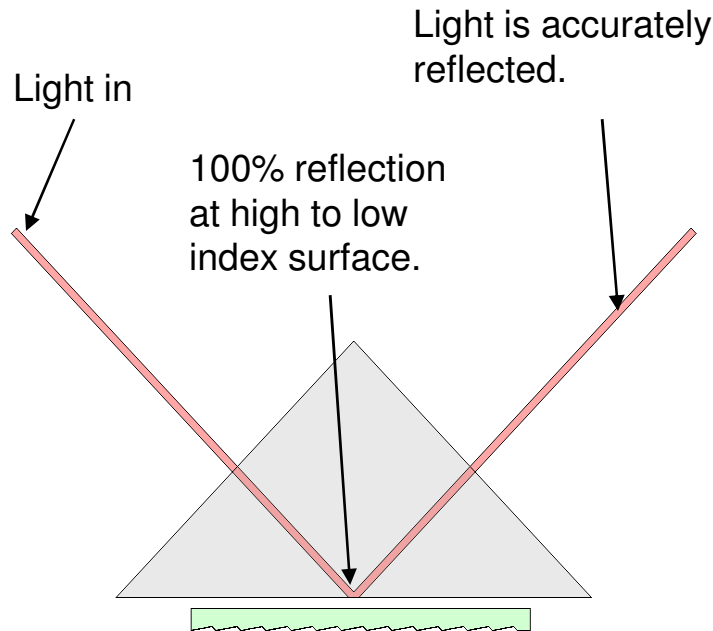
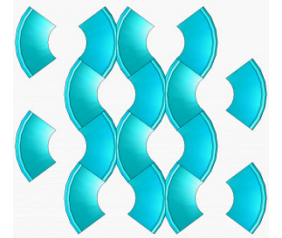
LCD backlights
have defects to
allow the light to
escape.

FPR - Imagines' new optics

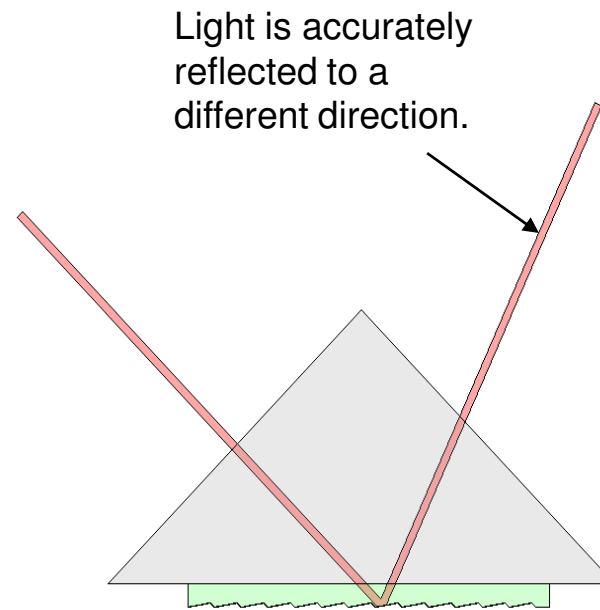
Zemax software ray trace



TIR light valve - Imagines' new light valve



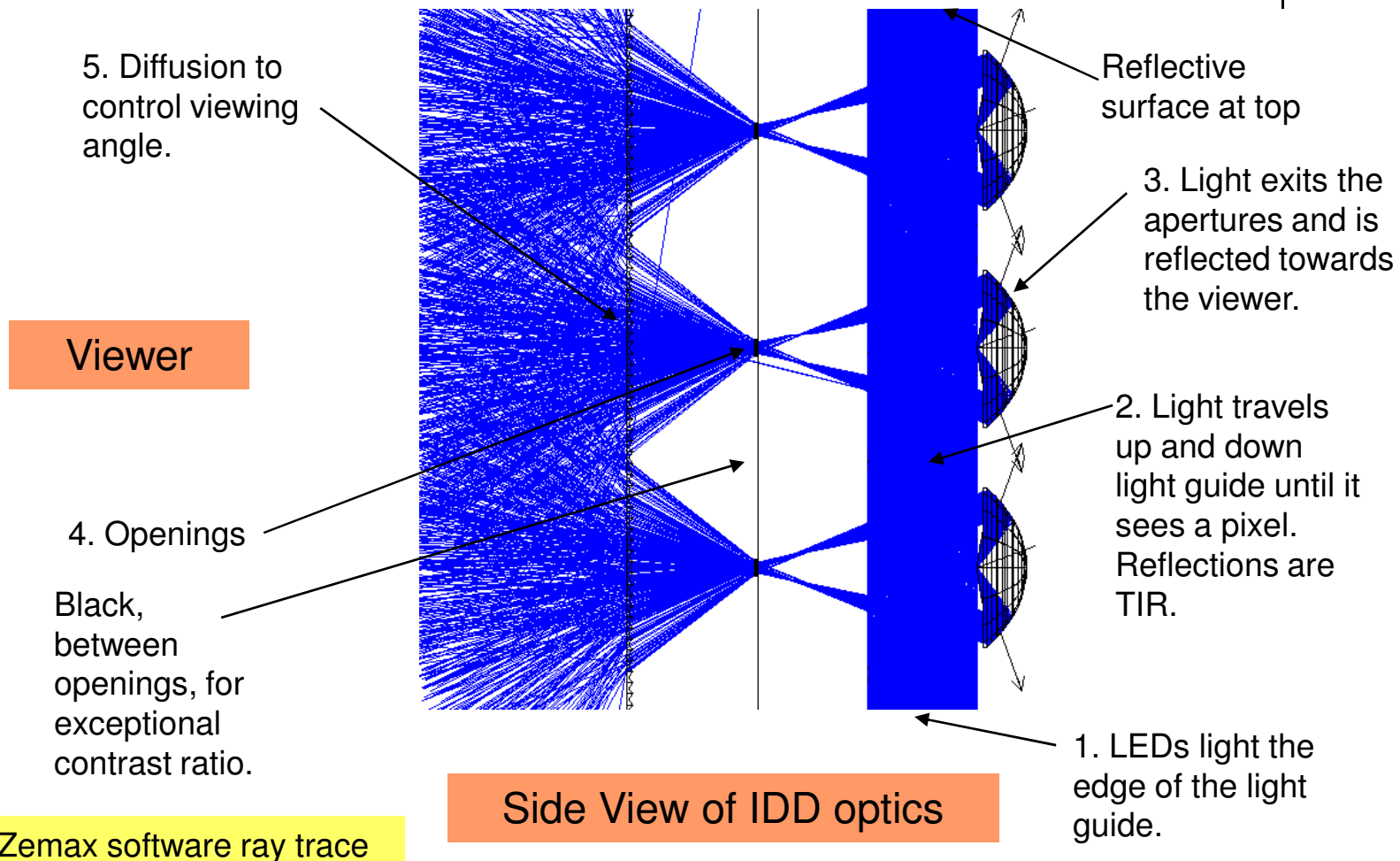
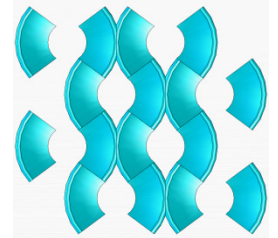
Traditional TIR,
Light doesn't jump
the small air gap.



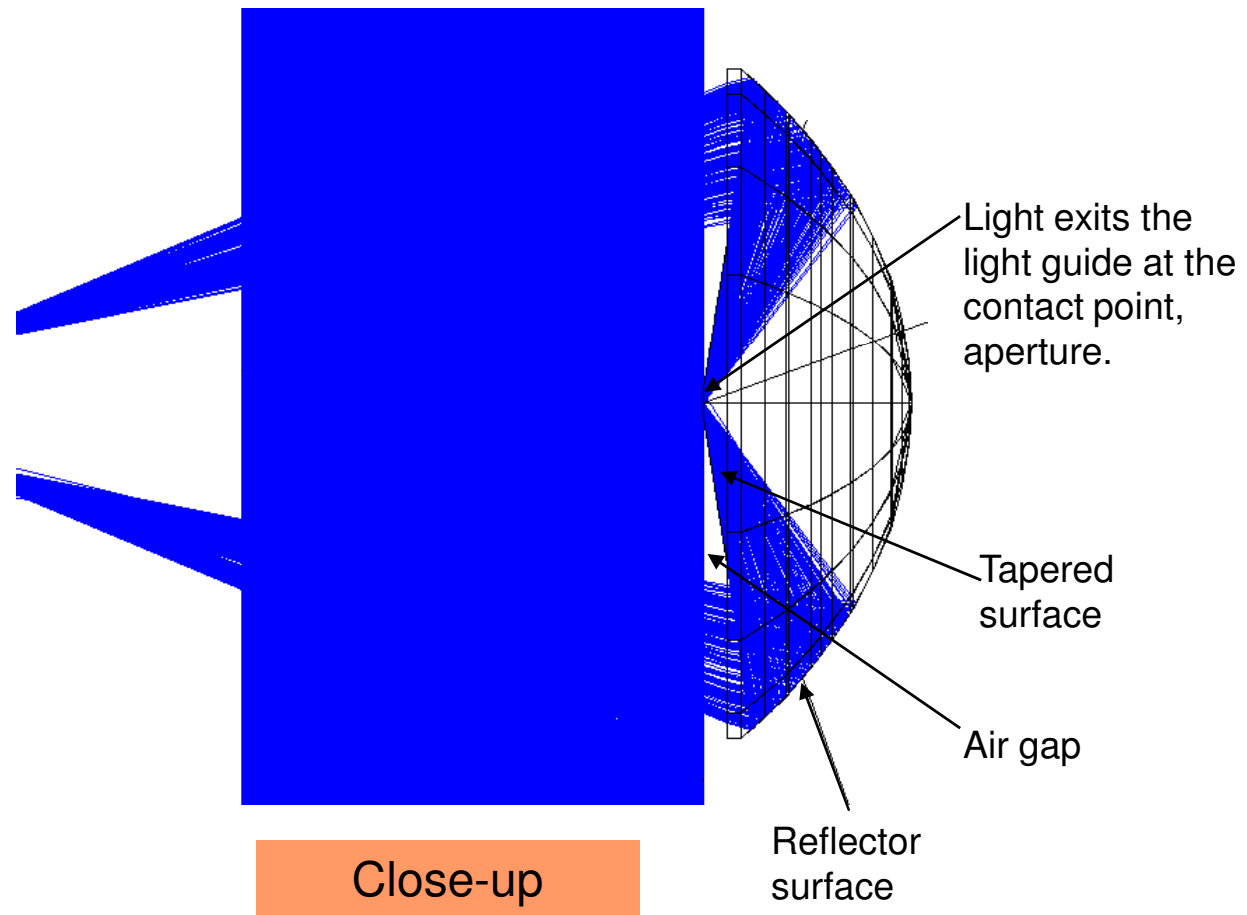
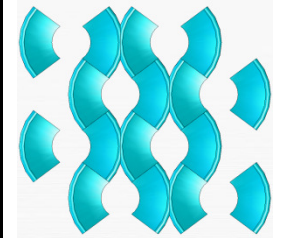
Air gap is removed.
Light reflects off second
surface.

IDD- Imagines' new display

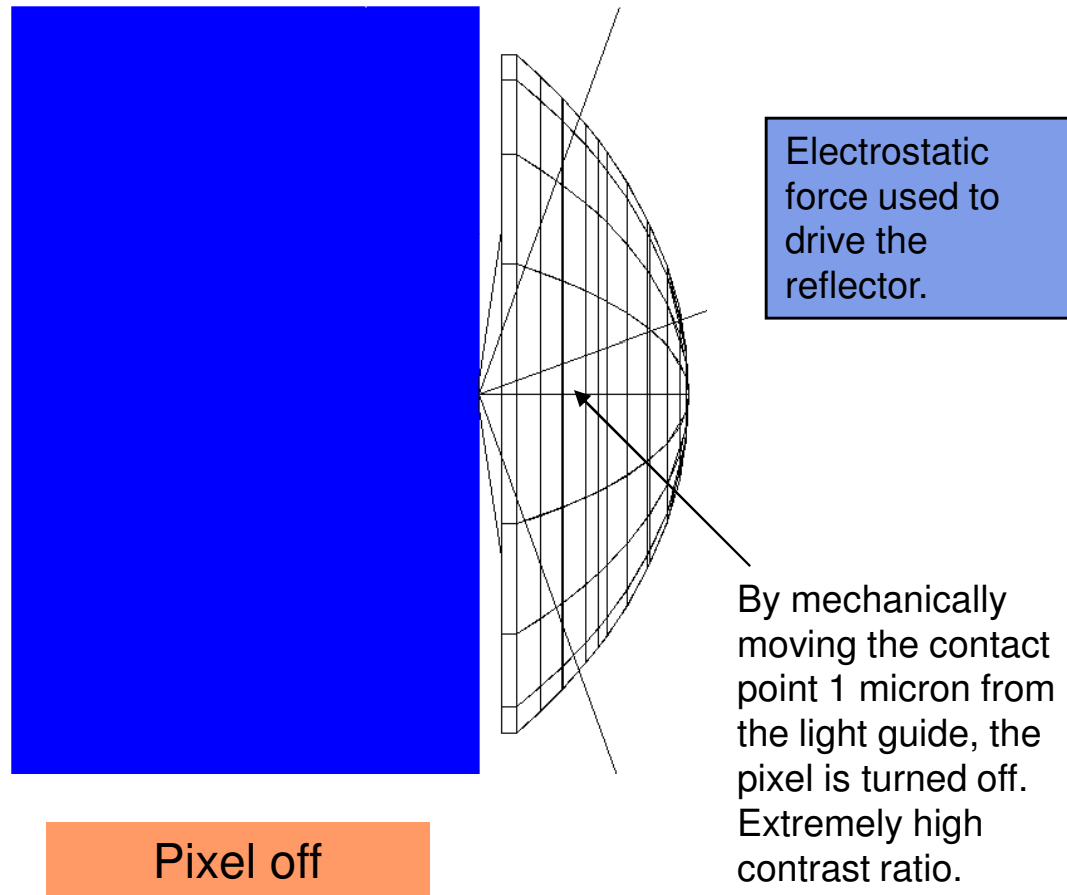
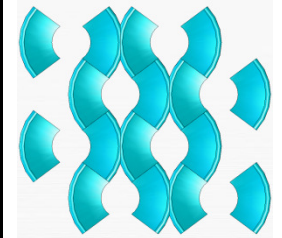
The combination of FPR and the TIR light valve into a display.



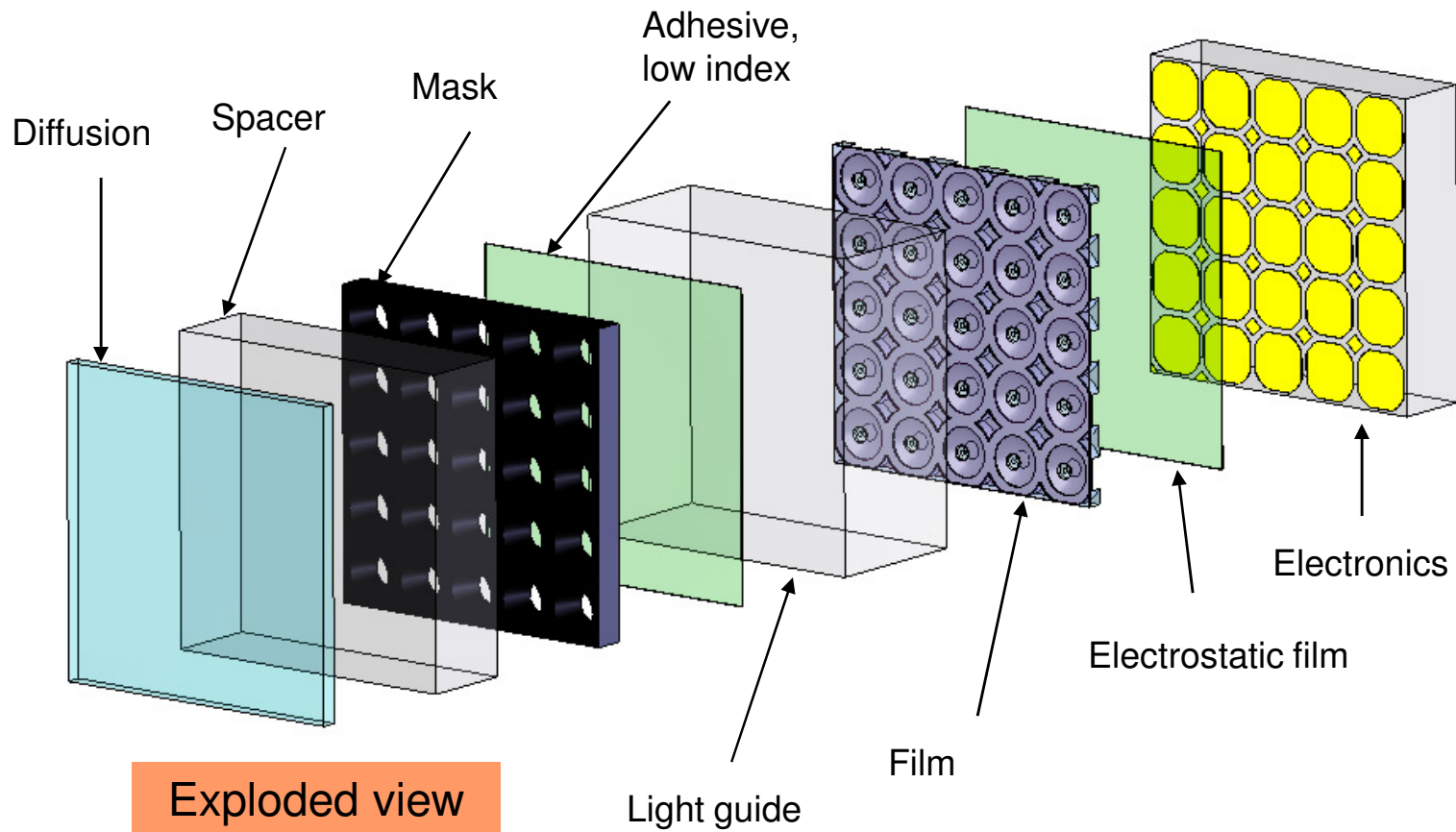
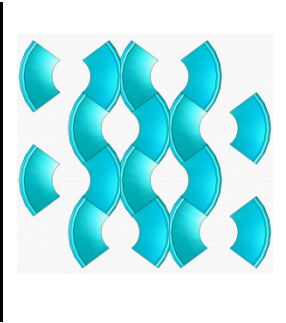
IDD- Imagines' new display



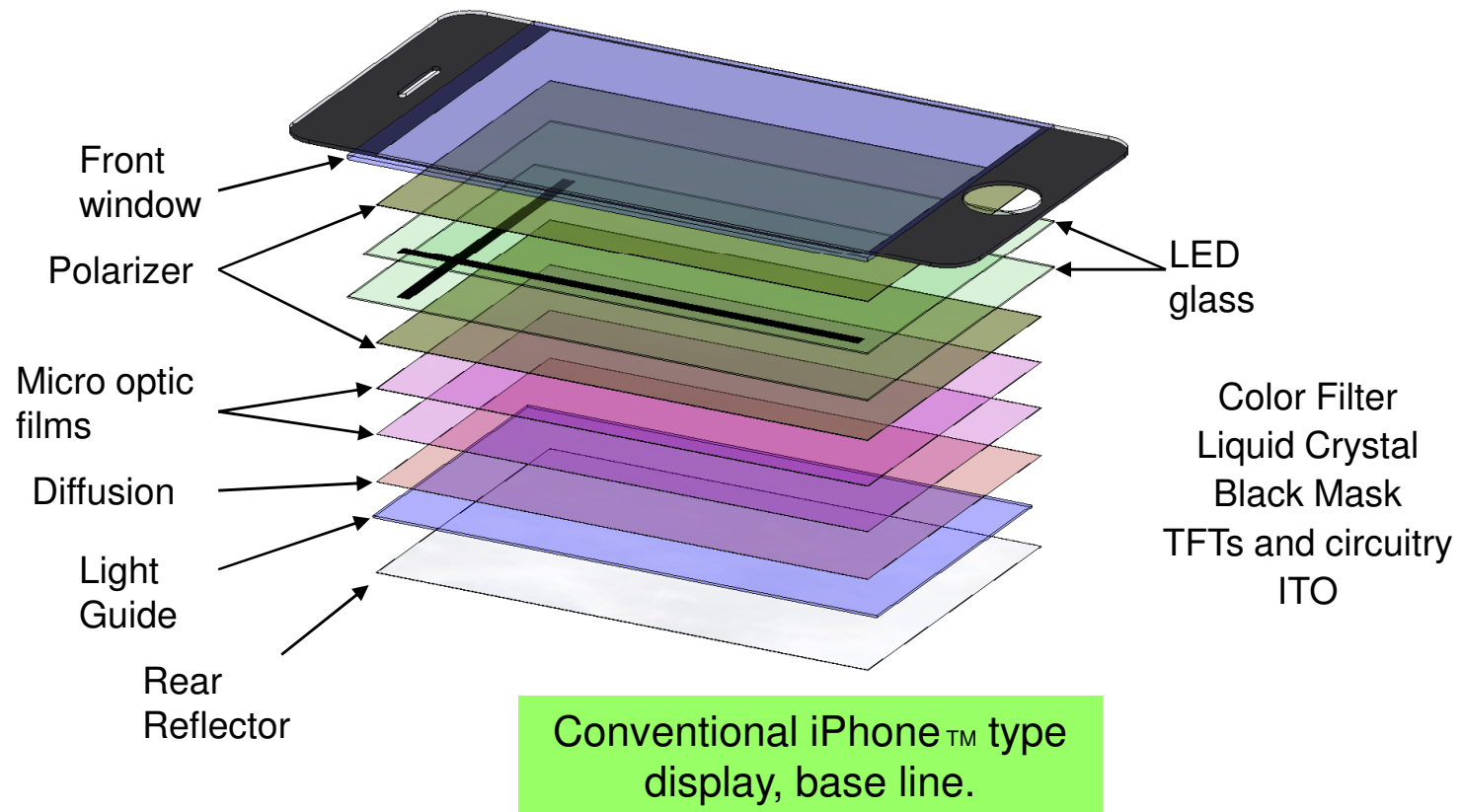
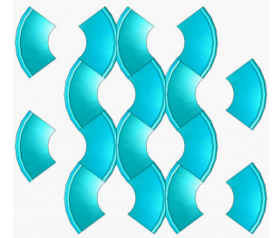
IDD - Imagines' new display



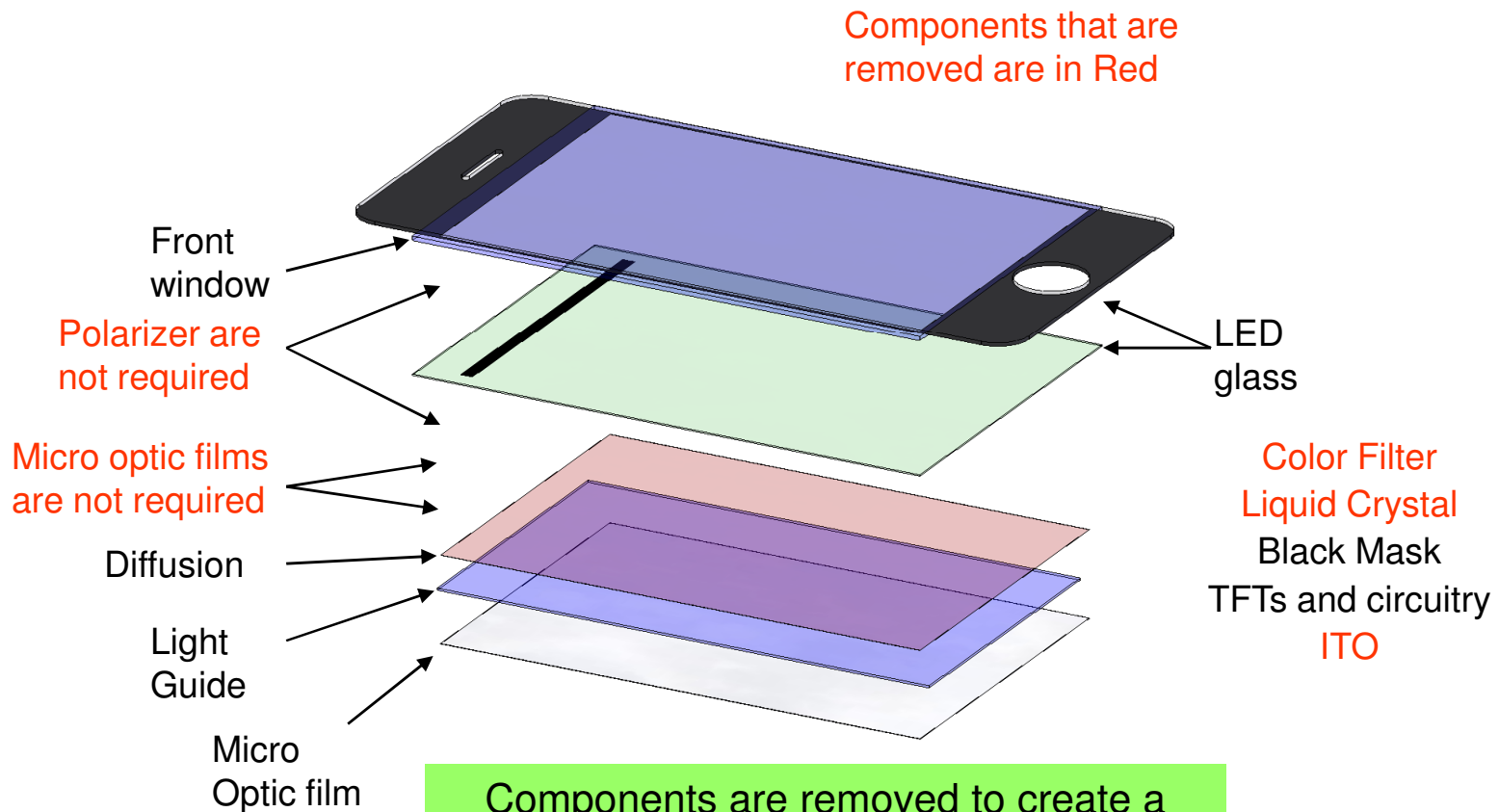
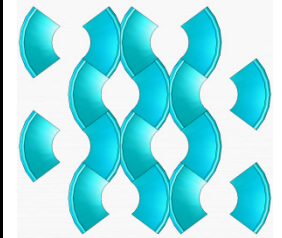
IDD - Small section of the display



Example - iPhone™ - Current Technology

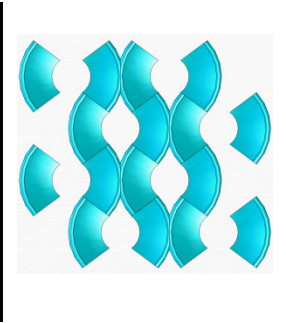


Example - iPhone™ - With IDD

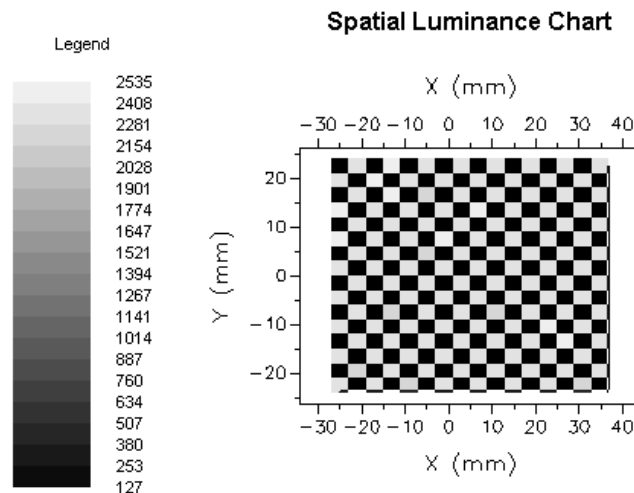


Components are removed to create a display with IDD. The components are assembled in a different position.

Results from ORA analysis

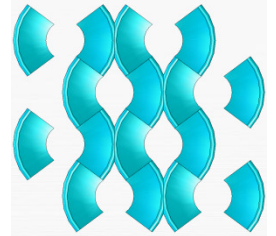


- Optical Research Associates, ORA, evaluated a cell phone sized (48 mm x 64 mm) display for Imagine Designs. A summary of their results are:
- Contrast ratio: greater than 7000:1 (iPhone 300:1)
- Brightness: greater than 1600 NIT (iPhone 300 NIT)
- Off-axis contrast ratio (30 degrees from normal): greater than 600:1
- Checkerboard contrast ratio: greater than 500:1
- Field Quality:



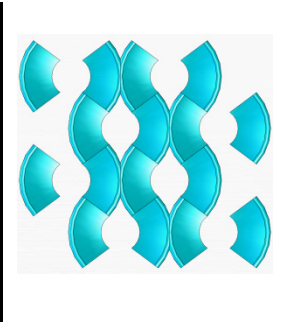
On-axis Luminance across the display surface.

Results from ORA applied to TV

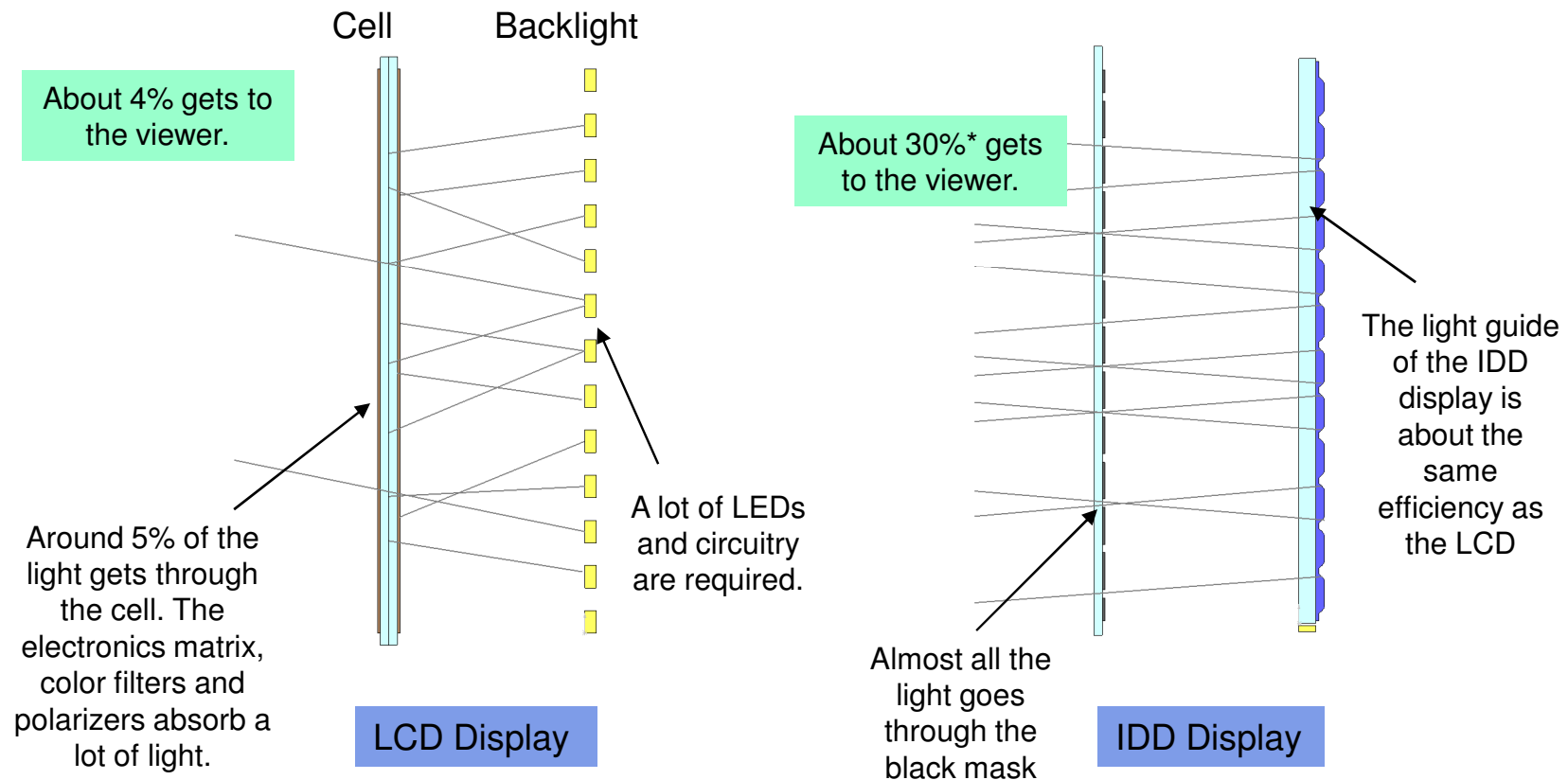


- Applying the Optical Research Associates, ORA, analysis to a 46 inch TV. A summary of the results are:
- Brightness: greater than 600 NIT
- Contrast ratio: greater than 14,000:1, native all white / all black
- Contrast ratio with 50% of the pixels black: 18,000 (slightly dimmed BL to maintain white pixels at same brightness as all full on screen above)
- Contrast ratio with 75% of the pixels black: 23,000 (dimmed BL to maintain white pixels at same brightness as all full on screen above)
- Contrast ratio with 95% of the pixels black: 30,000 (dimmed BL to maintain white pixels at same brightness as all full on screen above)
- Off-axis contrast ratio (30 degrees from normal): greater than 1200:1
- Power: 30 watts (with a full white screen).

Why IDD TVs consumes much less power than LCD TVs

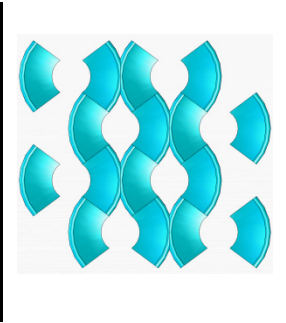


IDD displays are much more efficient than LCD.
This lets them be brighter and use less power.

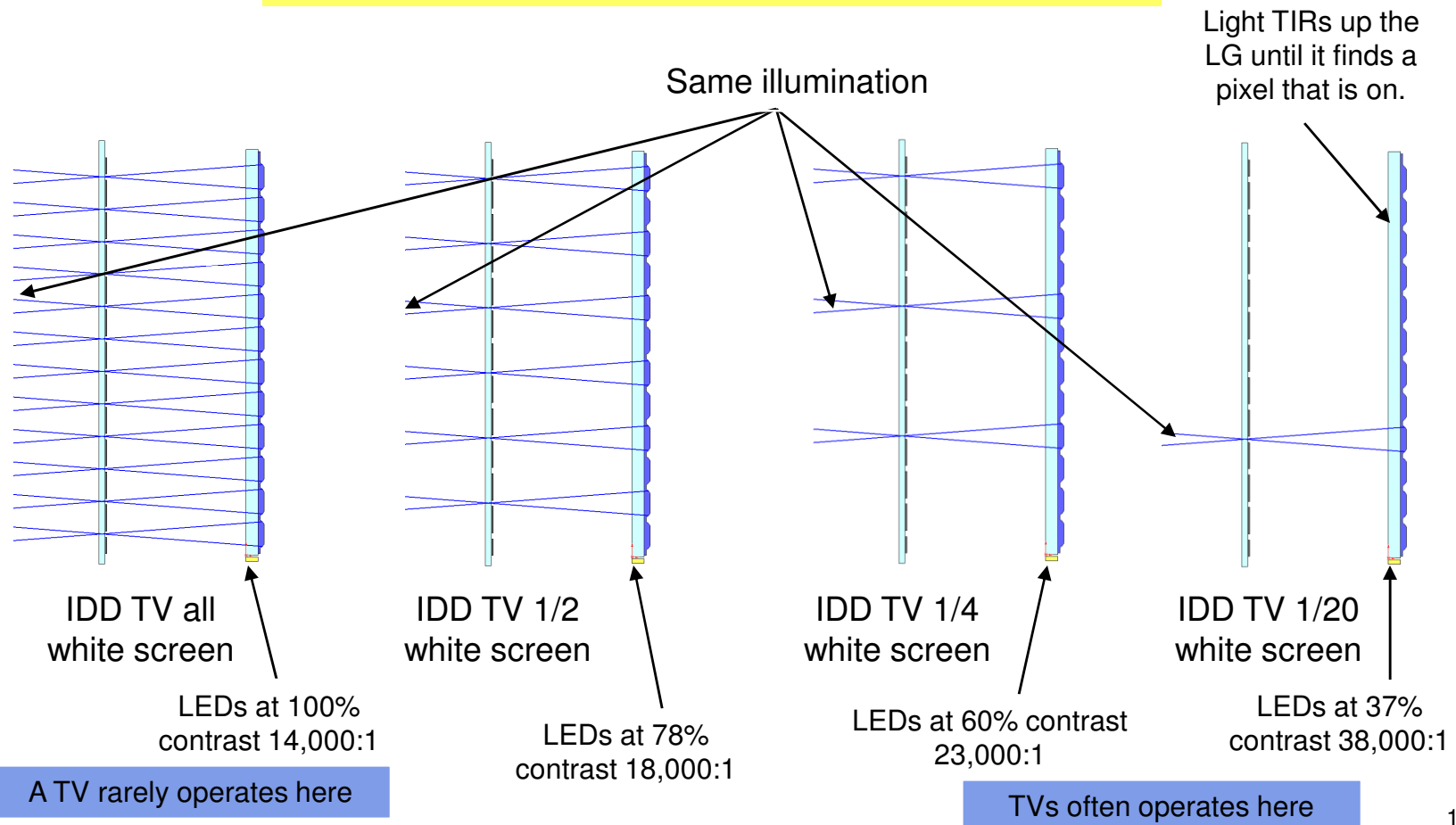


* results of ORA, light tools analysis

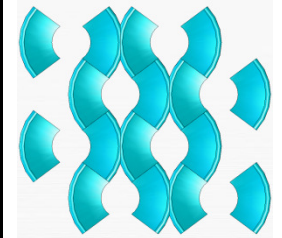
IDD TVs with a screen that has not all white



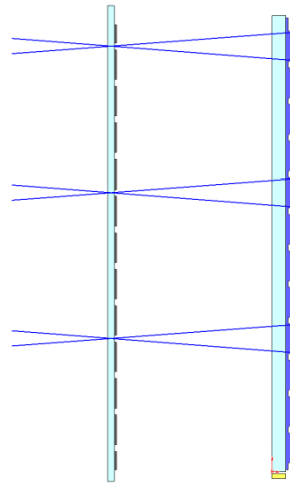
When an IDD TV has a screen that is not all white the contrast ratios goes up and they use even less power



IDD TVs average power



When an IDD TV has a screen that is not all white the contrast ratios goes up and they use even less power

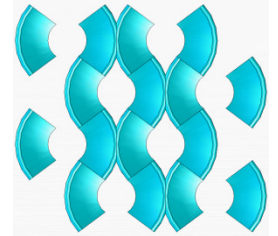


LEDs at 60% contrast
23,000:1

A 46" TV would, on average
consume 18 watts

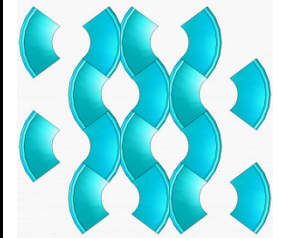
IDD TV 1/4
white screen

IDD TVs California power savings



- 3,831 Gigawatts (Gw) (331/3%) savings/year
thus consumption is 11,493 Gw.
- @ \$0.14/Kw then cost /year in CA is \$1,609,020,000 i.e. \$1.6 Billion to power TVs
- Average TV46" 904.02 *sq.in.*
- January 1, 2011 0.156 watts x Screen area /sq. inch + 32 = 173 watts
- January 1, 2013 0.120 watts x Screen area /sq. inch + 25 = 133.5 watts
- Imagine Designs' power consumption for 46" TV = 25 watts i.e. ~80% reduction
- IDI technology which will consume at least 75% less power
- thus saving more than \$1Billion per year in CA.
- more than \$10 Billion per year in the United States.

IDD - Cost of LCD and IDD



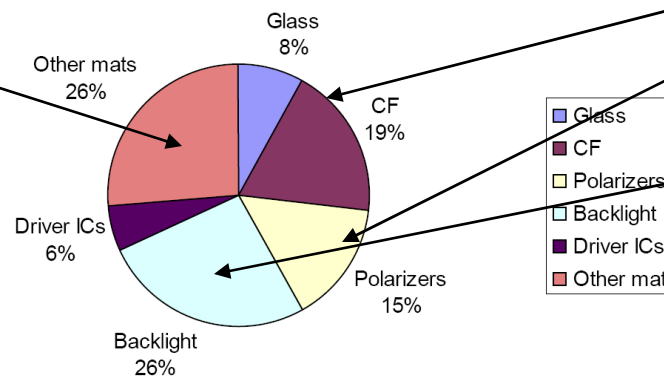
Not only do IDD TVs perform better they are lower in cost

32" LCD TV Component Costs



Breakdown of Material/Component Costs 32" WXGA

Some
reduction
in cost.



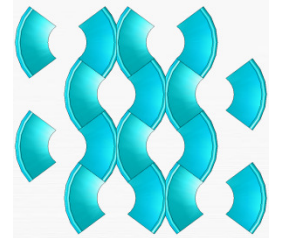
Not required
for IDD
technology.

Significant
reduction
in cost.

Better backlight technology is critical to LCD-TV development

IDD TVs are less than 1/2 the cost to
manufacture than LCD TVs.

Summary



- TVs manufactured with IDD technology will:
 1. Exceed performance of current LCD TVs in contrast ratio, brightness, viewing angle, color gamut, thickness, and refresh rate.
 2. They will consume significantly less power than LCD TVs, at least 75% less.
 3. They will be significantly expensive to manufacture than LCD TVs.