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# ORGANIC LIGHT-EMITTING DIODE (OLED) WITH RESONANT STRUCTURE

## HARDWARE, CIRCUITS, & SENSORS

Directive optical device that integrates a patch grating resonator within an organic LED structure.

### TECHNOLOGY TYPE

Semiconductors  
LED  
OLED

### STAGE OF DEVELOPMENT

- Proof of concept demonstrated through simulations.
- Prototype in development.

### IP PROTECTION

#### Nationalized PCT Issued in the United States

Directive Optical Device  
Having a Partially Reflective  
Grating  
US9470396B2

### LEARN MORE

Reference Number: U-4660

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### TECHNOLOGY SUMMARY

Existing light emitting devices suffer from efficiency problems, such as incomplete light extraction from active layers. This inability to direct light from the diode results in an 180° active range of light emission and power losses.

The OLED with Resonant Structure utilizes two mirrors to increase the radiative efficiency of OLEDs by 80-100 percent. The first mirror is a partially reflective, metallic patch grating resonator that reduces lateral propagation of radiative emissions' diffusion. The second mirror is a transparent electrode of the OLED, which communicates with the optically active material. Together, these mirrors almost double the output power of the LED.

### FEATURES AND BENEFITS

- Focuses light emissions to increase radiative efficiency by 80-100 percent.
- Increases power output of the LED by 2x.
- Improves directionality of emitted light.
- Applicable to flexible displays.

### RECENT PUBLICATIONS

McDaniel, S., Blair, S. (2010). Increased OLED radiative efficiency using a directive optical antenna. *Optics Express*. 18(16):17477. doi:10.1364/oe.18.017477

### INVENTOR PROFILE

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