

Precise Control of Organic LED Emission Through Optically-Resonant Microcavity Confinement

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Introduction

OLED Devices

Waveguides and the Fabry-Pérot Etalon

Microcavity-confined OLEDs

Experimental Methods

Results

Single Cavity Devices

Multi-cavity Devices

Conclusions

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OLED Materials

Device Fabrication

Angle-Resolved Electroluminescence Spectroscopy (ARES)

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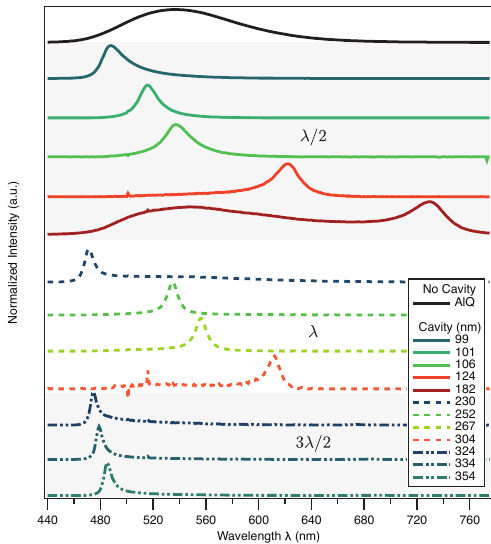
Single Cavity Devices

Multi-cavity Devices

Conclusions

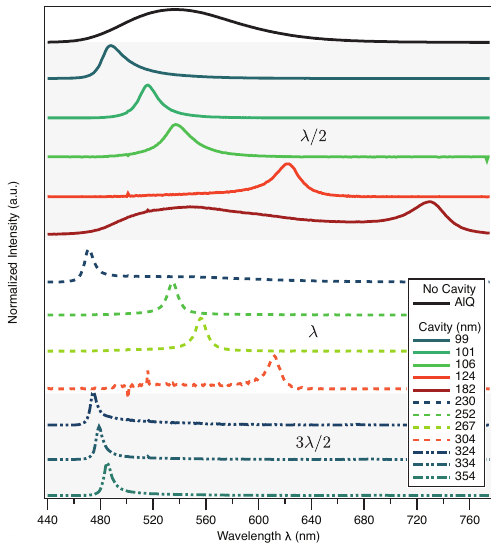
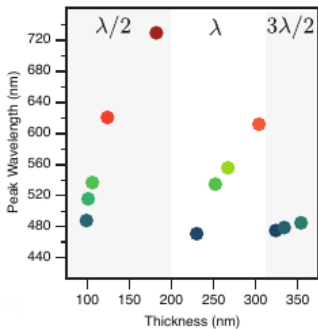
Single Cavity Devices

Test



Peak Emission Wavelength

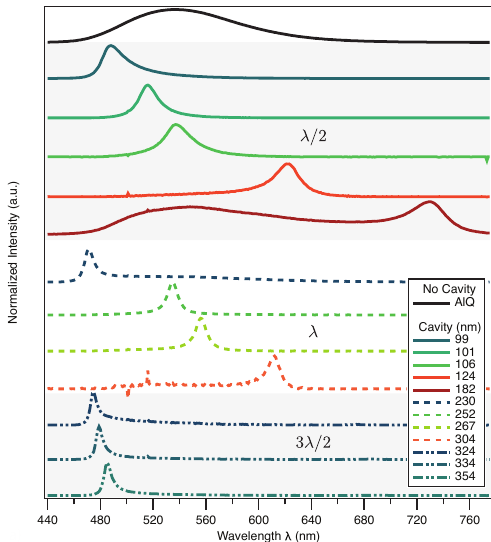
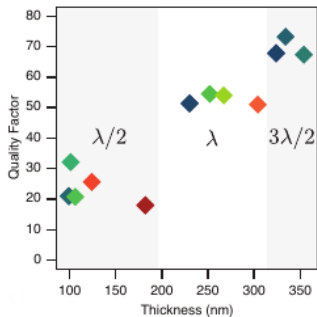
Equations?



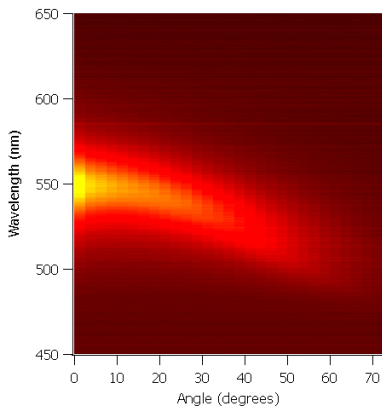
Band Narrowing

$$Q = q \left\{ \frac{1 - \sqrt{R_1 R_2}}{\pi (R_1 R_2)^{1/4}} \right\}$$

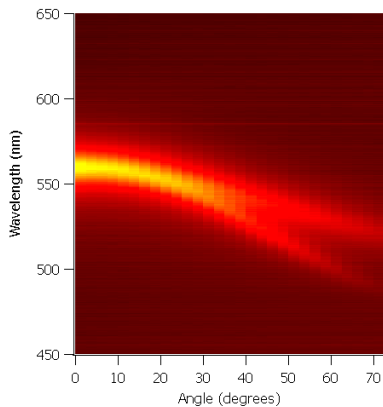
$$q = \frac{2nd}{\lambda_0}$$



Effect of Bottom Electrode Material



Aluminum bottom electrode

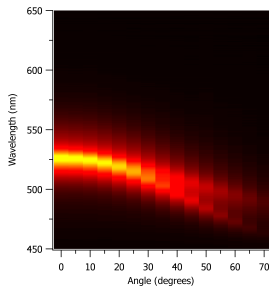


Silver bottom electrode

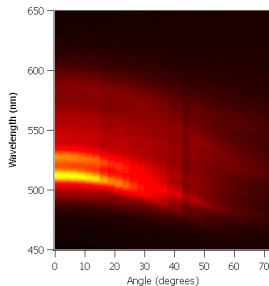
Multi-cavity Devices

Behavior at Large Angles

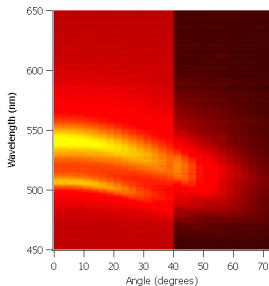
N=2



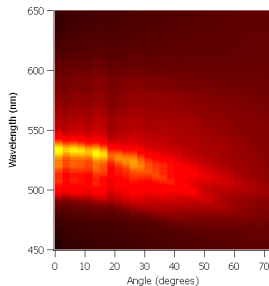
N=3



N=4

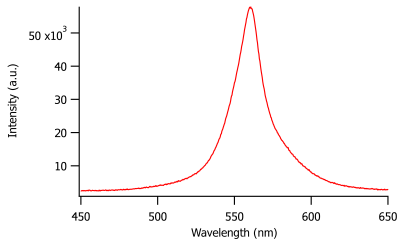


N=5

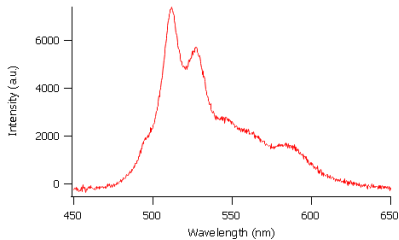


Number of Resonant Modes

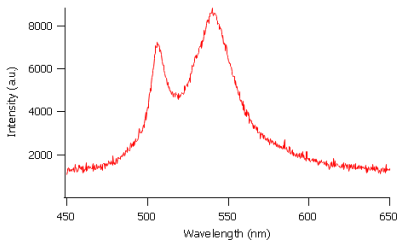
N=2



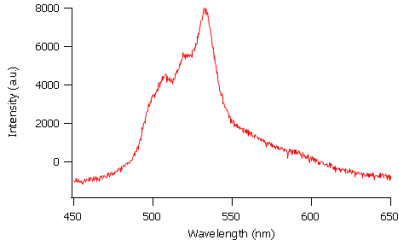
N=3



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N=5



Bandwidth of Resonant Modes

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Questions?