

Coherent emission from electrically-pumped organic semiconductors: resource letter

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Coherent emission from electrically-pumped organic semiconductors was demonstrated in 2005. The emission was characterized by a nearly diffraction limited beam and high-visibility interferograms with $V \approx 0.901 \pm 0.088$. This is a resource letter on the literature of coherent emission generated in electrically-pumped organic semiconductors. The areas covered include materials, experimental configurations, experimental results, and theory.

1. Organic molecules and semiconductor structures

- Chen C H, Fox J L, Duarte F J, and Ehrlich J J 1988 Lasing characteristics of new coumarin analog dyes: broadband and narrow-linewidth performance *Appl. Opt.* **27** 443-445
- Liao L S, Klubeck K P, and Tang C W 2004 High-efficiency tandem organic light-emitting diodes *Appl. Phys. Lett.* **84** 167-169
- Duarte F J, Liao L S, Vaeth K M, and Miller A M 2006 Widely tunable green laser emission using the coumarin 545 tetramethyl dye as the gain medium *J. Opt. A: Pure Appl. Opt.* **8** 172-174
- Duarte F J, Vaeth K M, and Liao L S 2010 Electrically excited organic light-emitting diodes with spatial and spectral coherence *US Patent 7667391*
- Duarte F J and Vaeth K M 2018 Electrically-pumped organic semiconductor laser emission *Organic Lasers and Organic Photonics* ed F J Duarte (Bristol: Institute of Physics) ch 11

2. Coherent emission and physics

- Duarte F J, Liao L S, and Vaeth K M 2005 Coherence characteristics of electrically excited tandem organic light-emitting diodes *Opt. Lett.* **30** 3072-3074
- Duarte F J 2007 Coherent electrically excited organic semiconductors: visibility of interferograms and emission linewidth *Opt. Lett.* **32** 412-414

- Duarte F J 2008 Coherent electrically-excited organic semiconductors: coherent or laser emission? *Appl. Phys. B* **90** 101-108.
- Duarte F J and Vaeth K M 2018 Electrically-pumped organic semiconductor laser emission *Organic Lasers and Organic Photonics* ed F J Duarte (Bristol: Institute of Physics) ch 11
- Duarte F J and Taylor T S 2021 *Quantum Entanglement Engineering and Applications*, (Bristol, Institute of Physics)
- Duarte F J and Taylor T S 2022 Quantum coherence in electrically-pumped organic interferometric emitters *Appl. Phys. B* **128** 11

3. Experimental interferometric configurations

- Duarte F J 1993 On a generalized interference equation and interferometric measurements *Opt. Comm.* **103** 8-14
- Duarte F J 2010 Electrically-pumped organic semiconductor coherent emission: a review *Coherence and Ultrashort Pulsed Laser Emission* ed F J Duarte (Rijeka: Intech) ch 1
- Duarte F J 2014 *Quantum Optics for Engineers* (New York: CRC)
- Duarte F J 2015 *Tunable Laser Optics* 2nd edn (New York: CRC)
- Duarte F J 2016 Coherent electrically-excited organic semiconductors *Tunable Laser Applications* 3rd edn ed F J Duarte (New York: CRC) ch 12
- Duarte F J and Vaeth K M 2018 Electrically-pumped organic semiconductor laser emission *Organic Lasers and Organic Photonics* ed F J Duarte (Bristol: Institute of Physics) ch 11

4. Quantum theory

- Duarte F J 1993 On a generalized interference equation and interferometric measurements *Opt. Comm.* **103** 8-14
- Duarte F J and Taylor T S 2021 *Quantum Entanglement Engineering and Applications*, (Bristol, Institute of Physics)
- Duarte F J and Taylor T S 2022 Quantum coherence in electrically-pumped organic interferometric emitters *Appl. Phys. B* **128** 11