

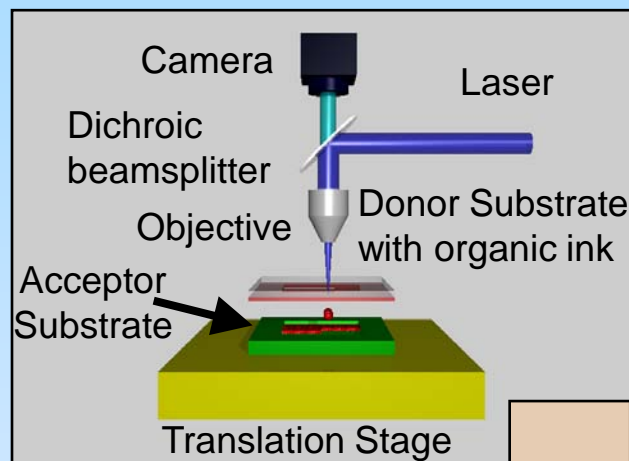


Damage-Free Laser Printing of Organic Electronic Molecules

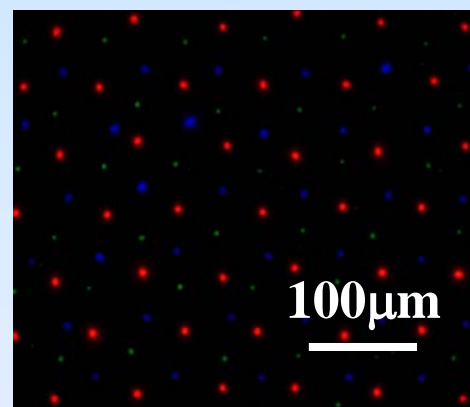
S. Bernhard and C. B. Arnold, Princeton University, DMR-0819860

Small organic electronic molecules have emerged as important competitors to traditional organic polymers for light emitting and harvesting applications. Their greater stability in air and compatibility with non-vacuum processing offer important advantages for diverse applications. However, such materials are susceptible to damage during processing which can degrade performance. Bernhard and Arnold recently developed a rapid, direct-write laser based printing method that can successfully deposit and pattern these delicate materials with high resolution and robust performance.

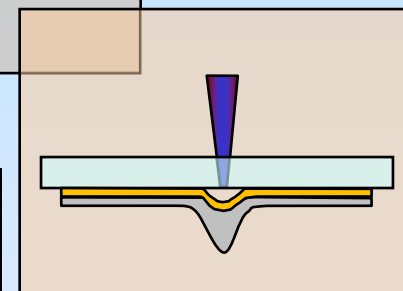
In this novel technique, reported in Applied Physics Letters¹, a thick-film polymer layer is used as a mechanical transducer which converts laser energy into mechanical energy in order to initiate a forward transfer process. The organic molecules are gently transported across a small gap to a receiving substrate. Tests confirm improved performance compared with other laser printing methods.



Basic Laser direct-write set-up



3-color array of < 10 micron pixels



Close-up showing laser absorption and polymer deformation leading to ink transfer

¹ N.T. Kattamis, N. D. McDaniel, S. Bernhard, C. B. Arnold, Appl. Phys. Lett. 94, 103306 (2009)