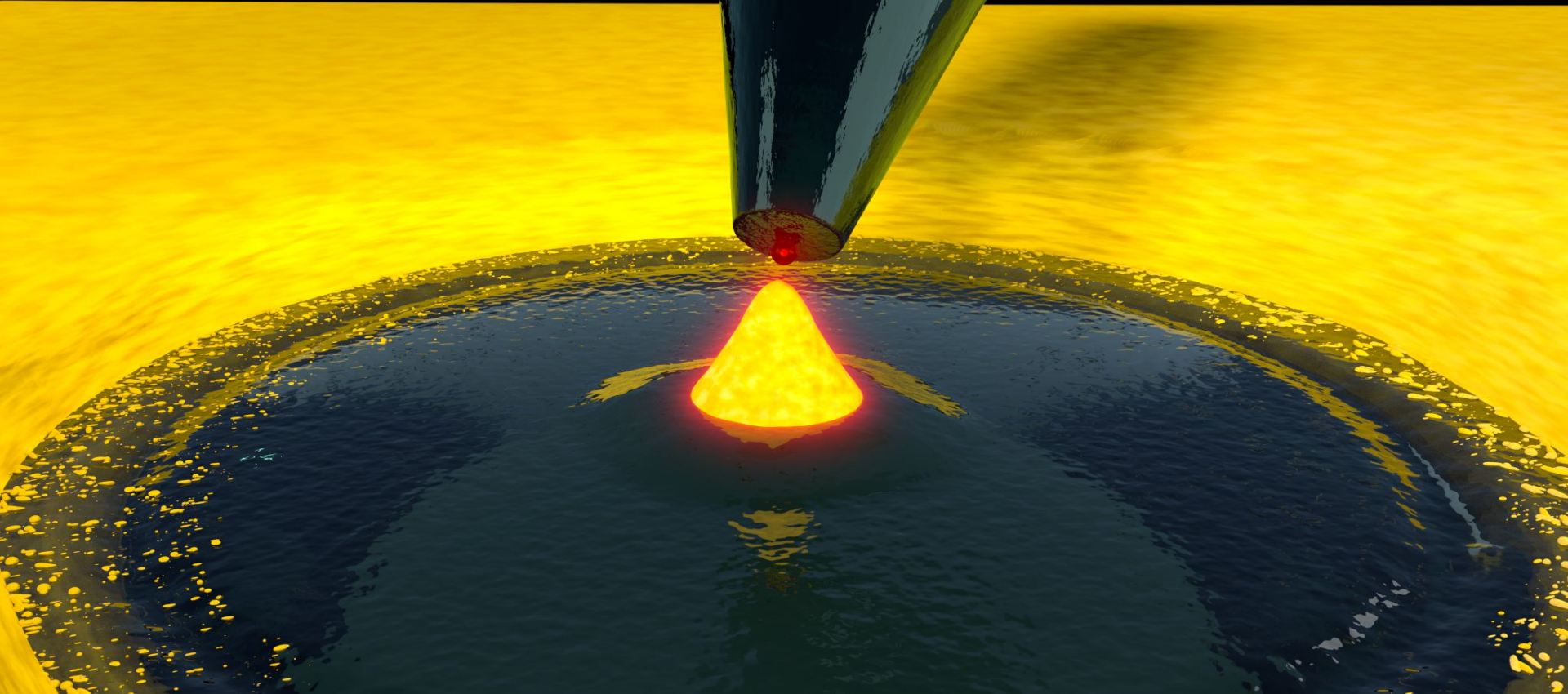


Controlled positioning of a single colloidal quantum dot over a nanocone antenna

Simon VASSANT



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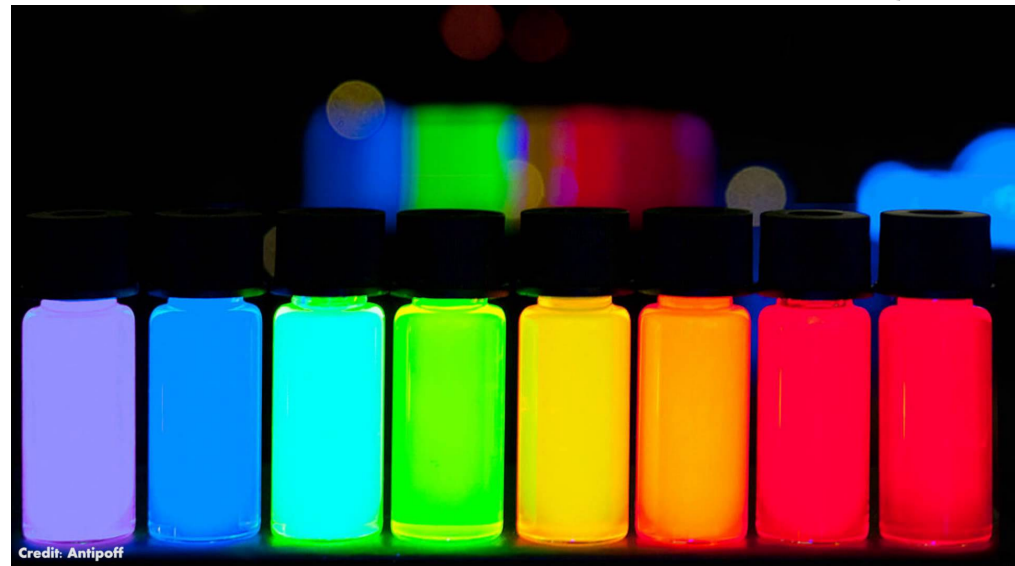
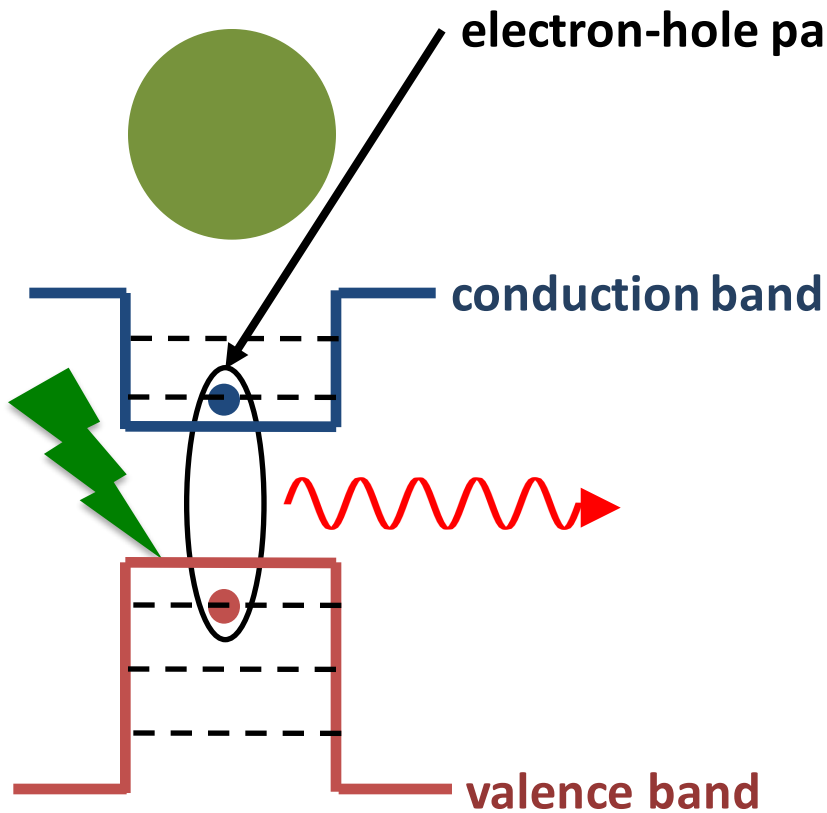
FRIEDRICH-ALEXANDER
UNIVERSITÄT
ERLANGEN-NÜRNBERG

 **Los Alamos**
NATIONAL LABORATORY
EST. 1943

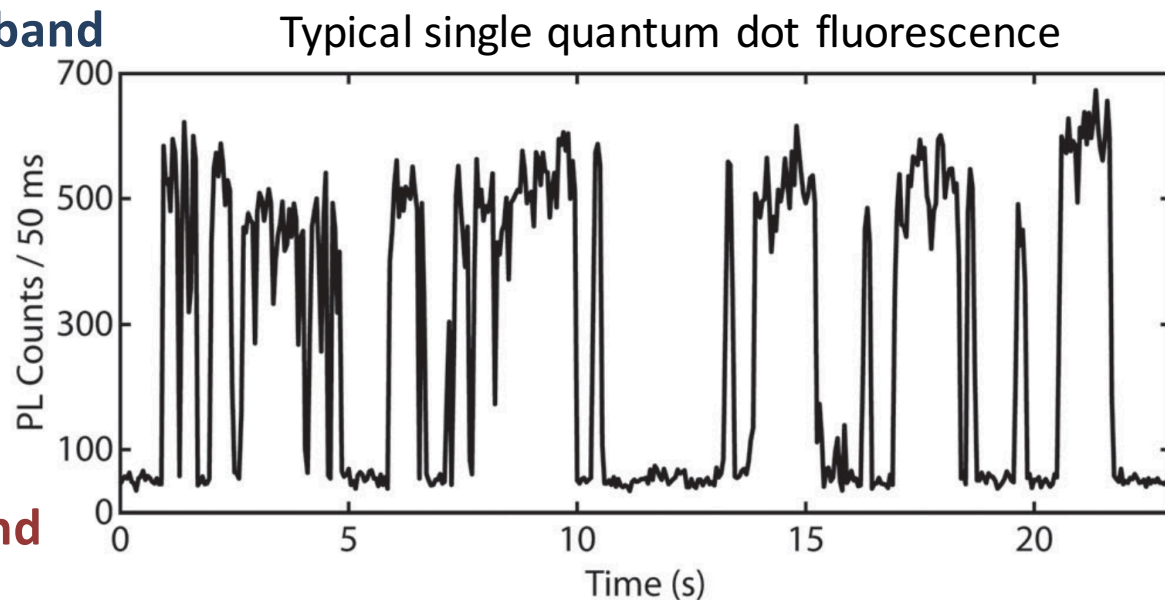
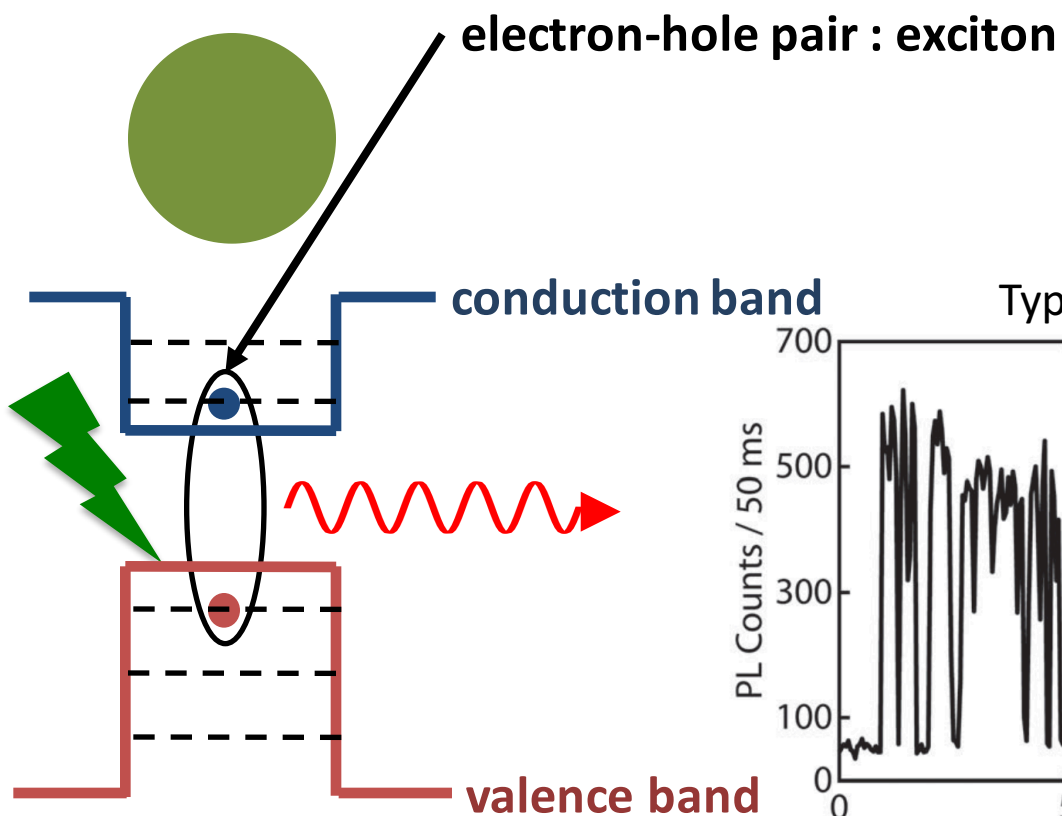
1/ Colloidal Quantum Dot (cQD) photophysics

2/ Plasmonic Nanocone

3/ Controlled positioning of a cQD over a nanocone

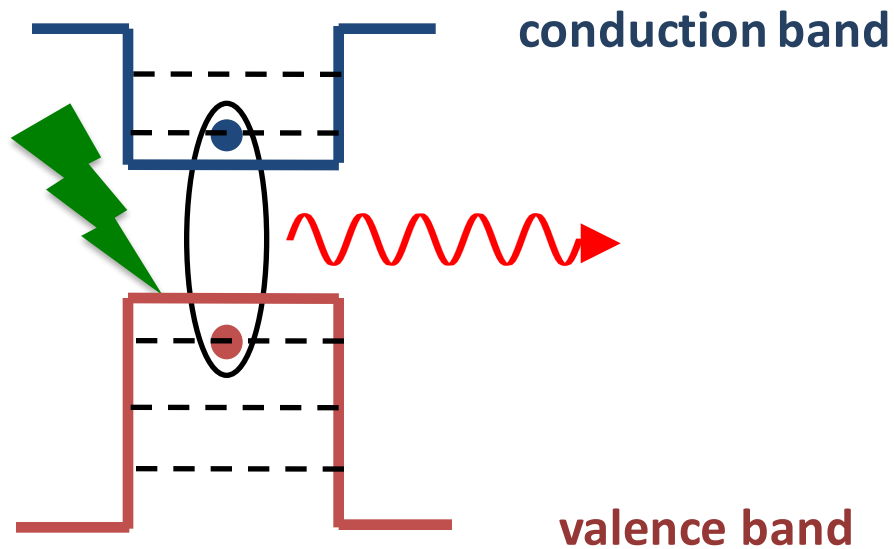


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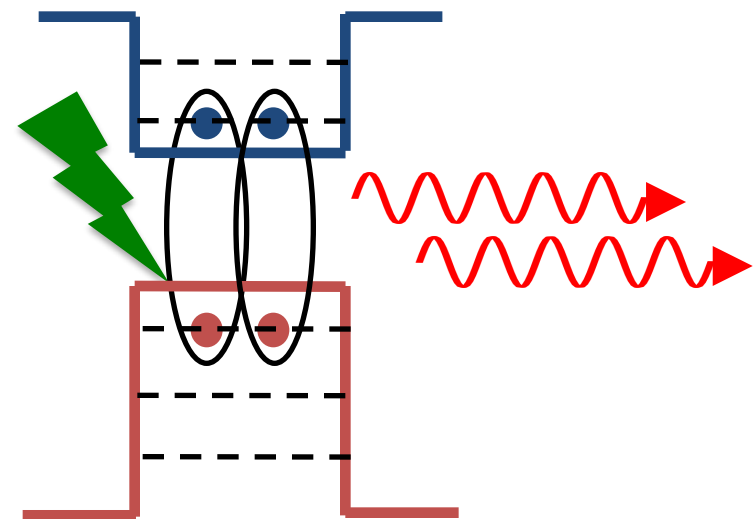


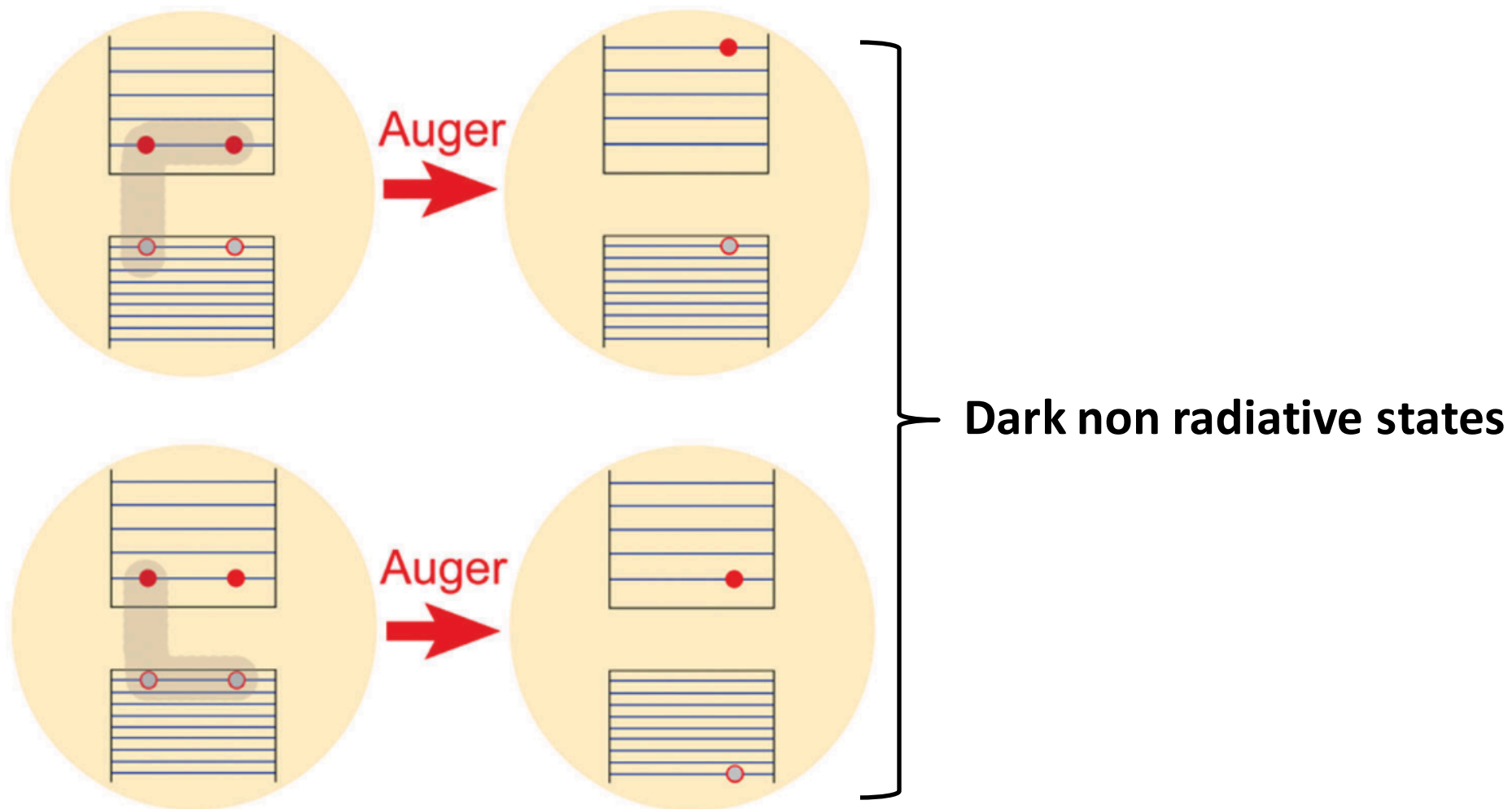
Chem. Soc. Rev., **43**, 1287 (2014)

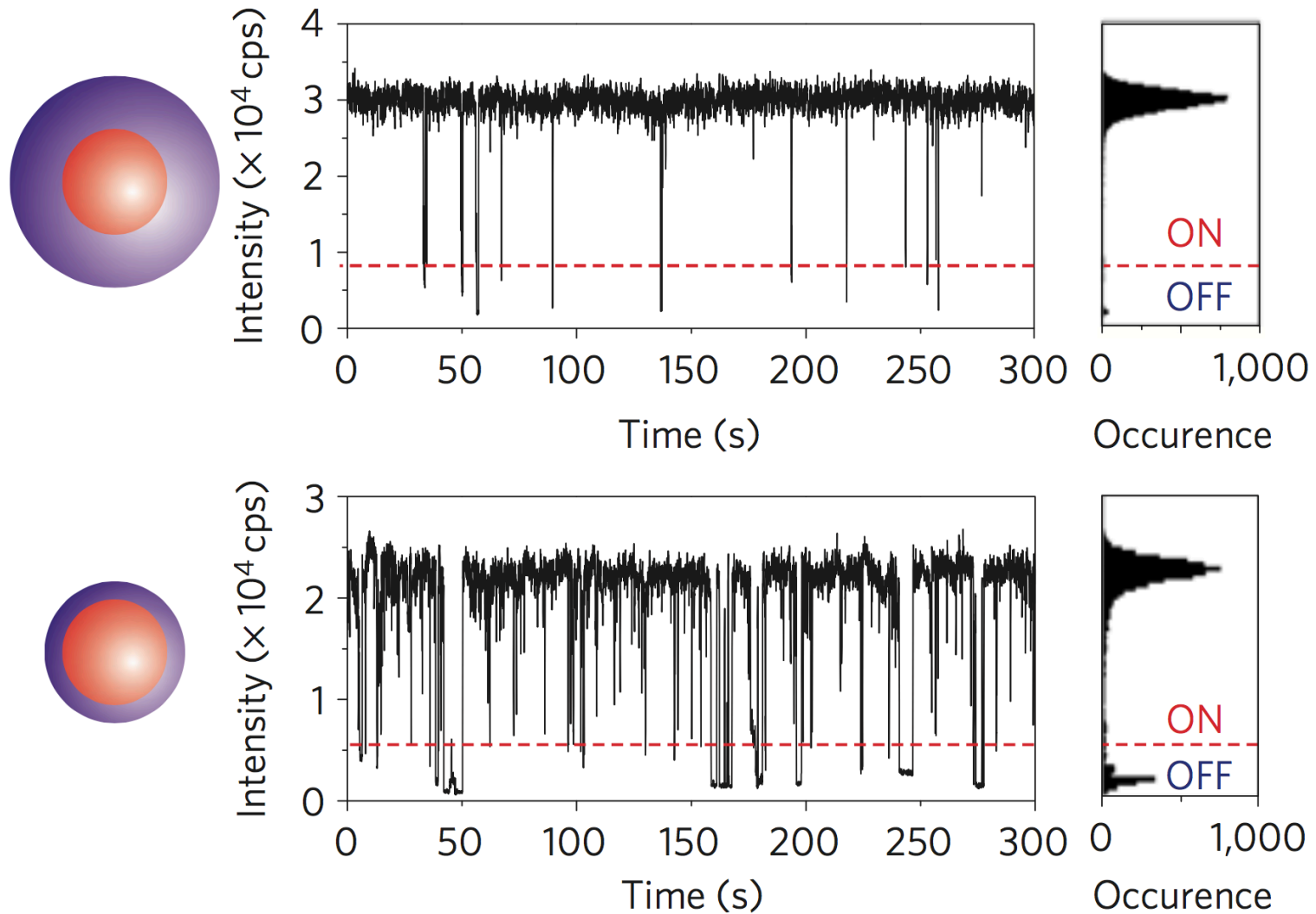
electron-hole pair : exciton



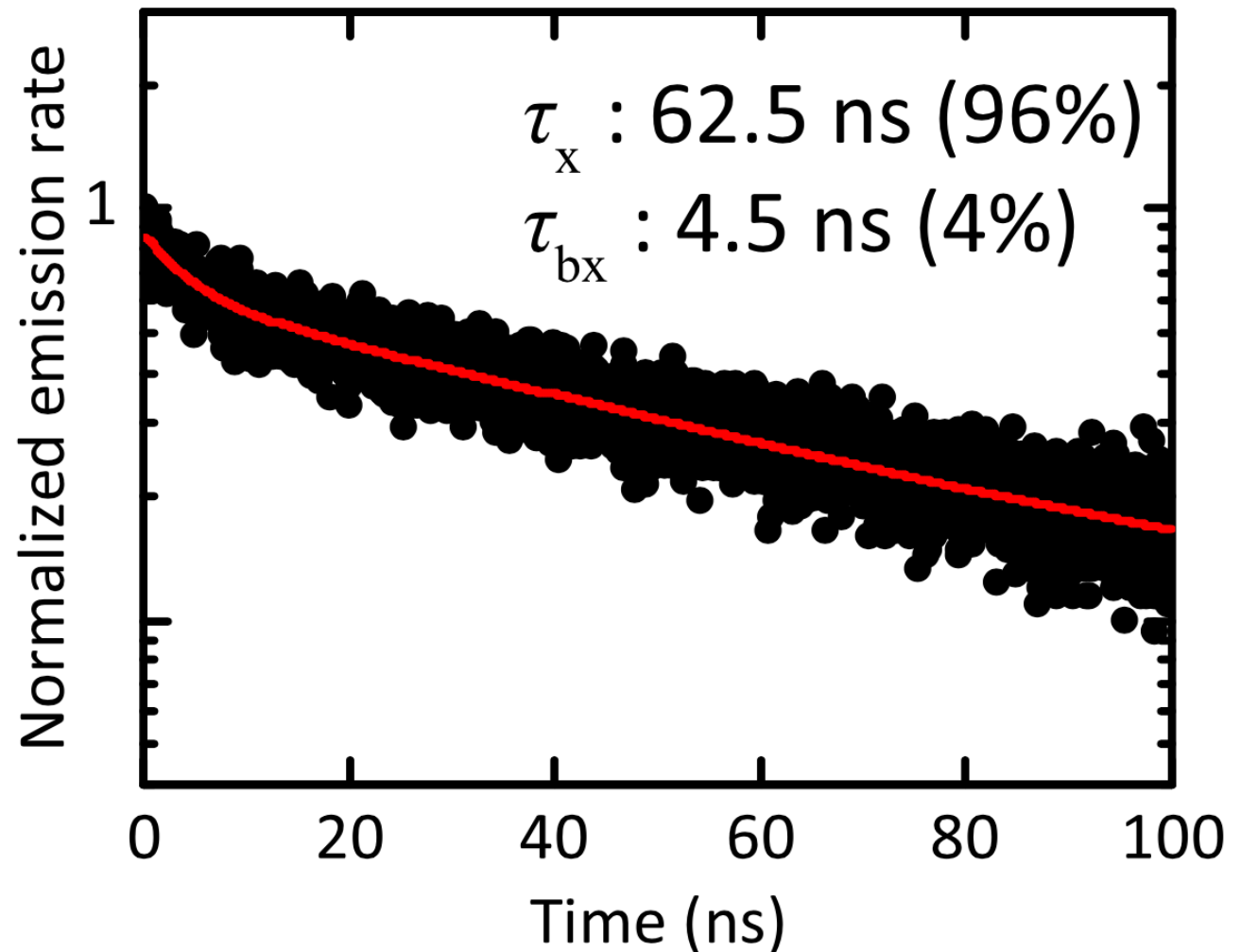
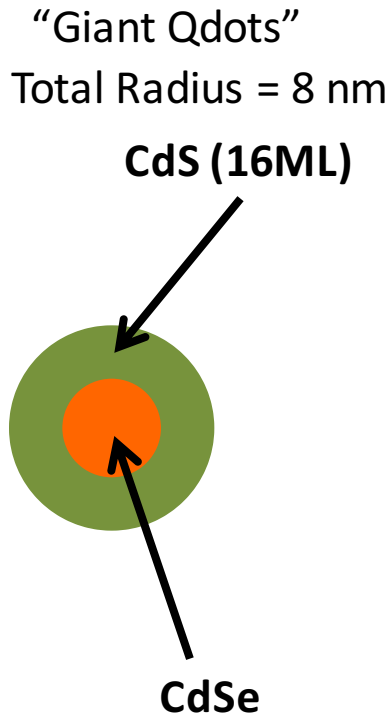
2 electron-hole pair : bi-exciton

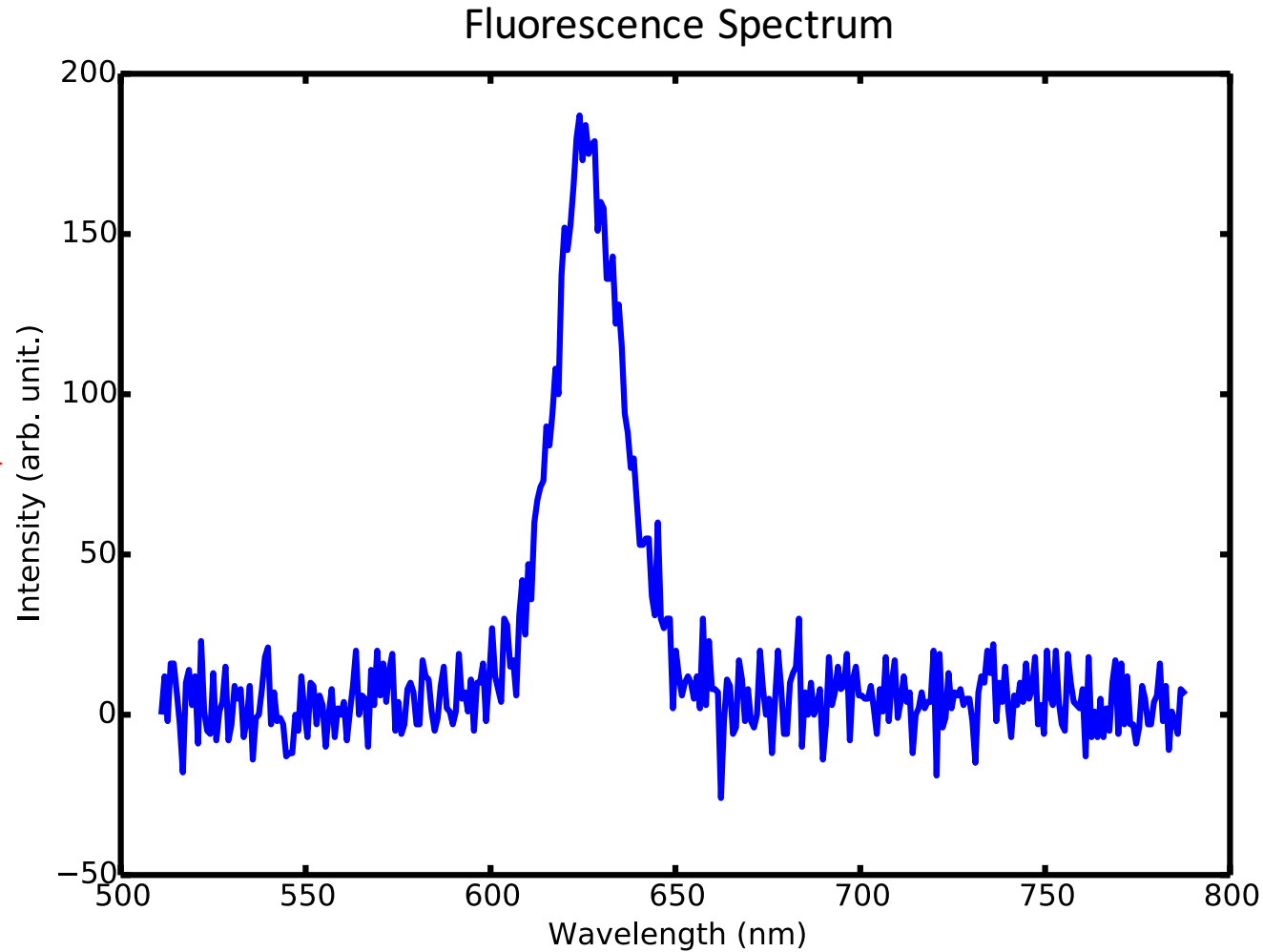
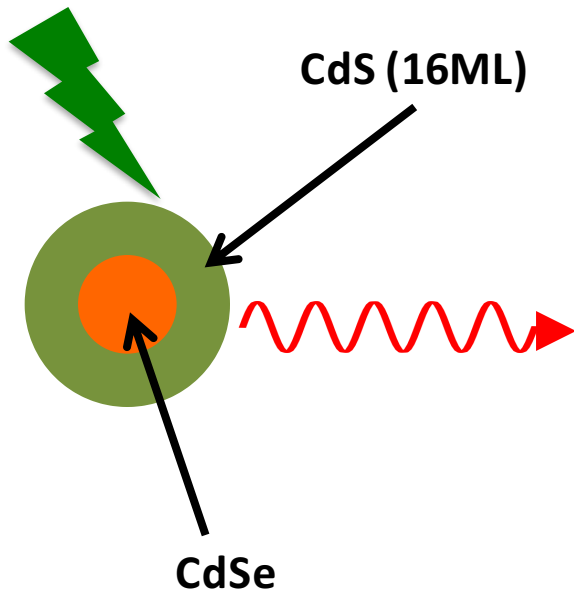




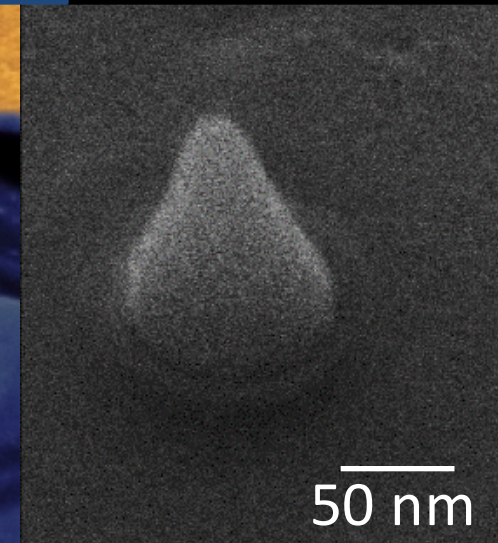
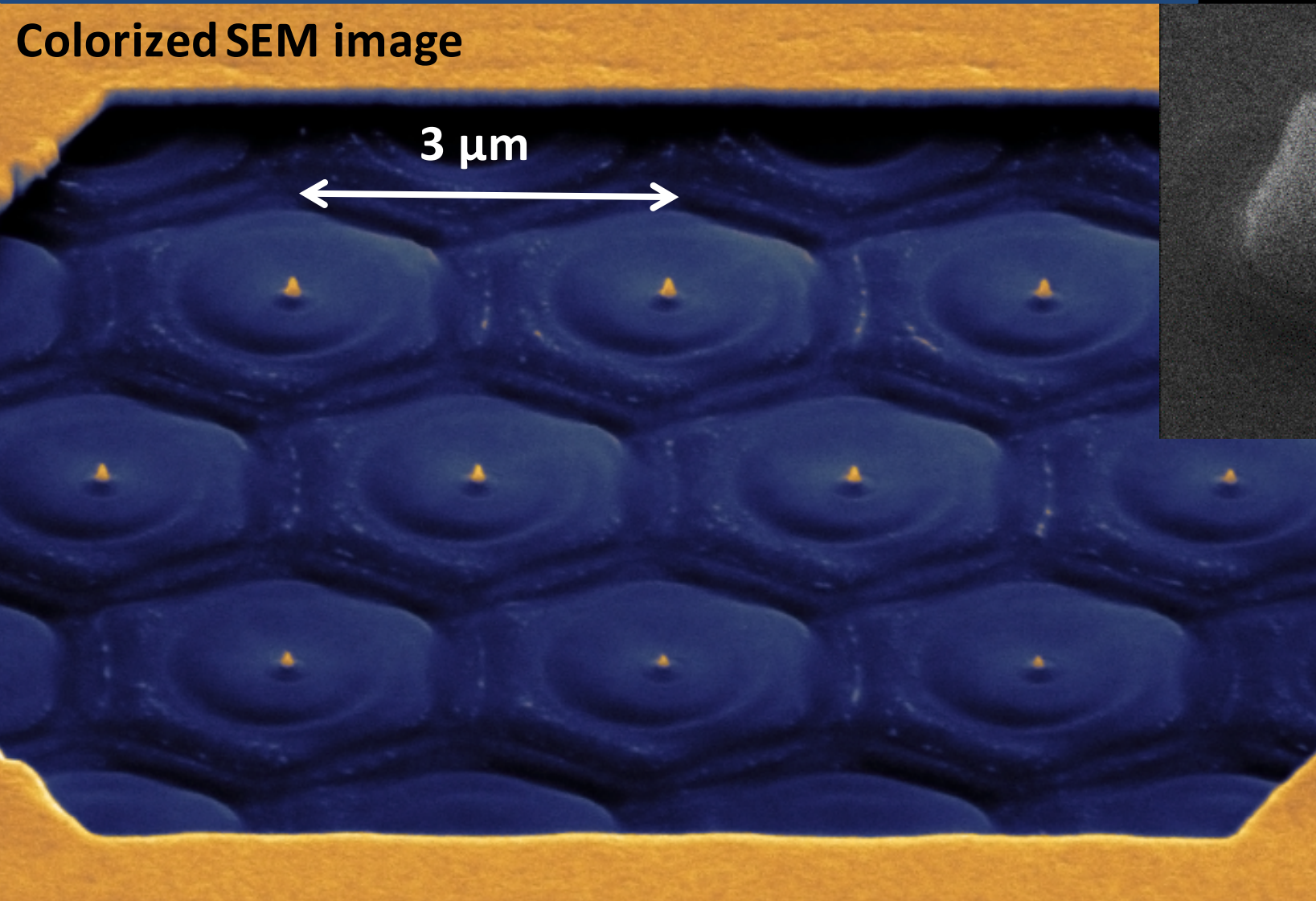


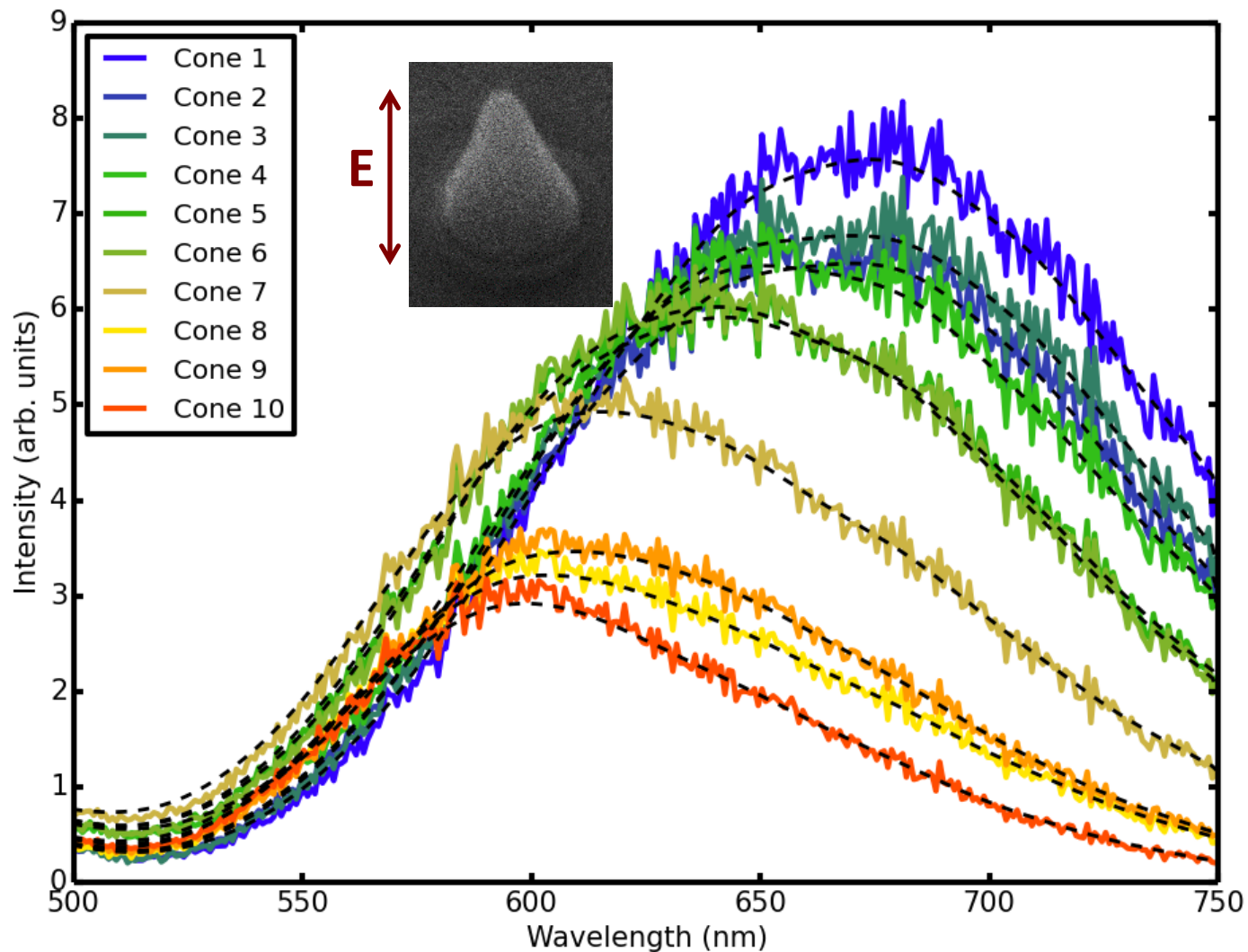
Nature Materials **12**, 445 (2013)

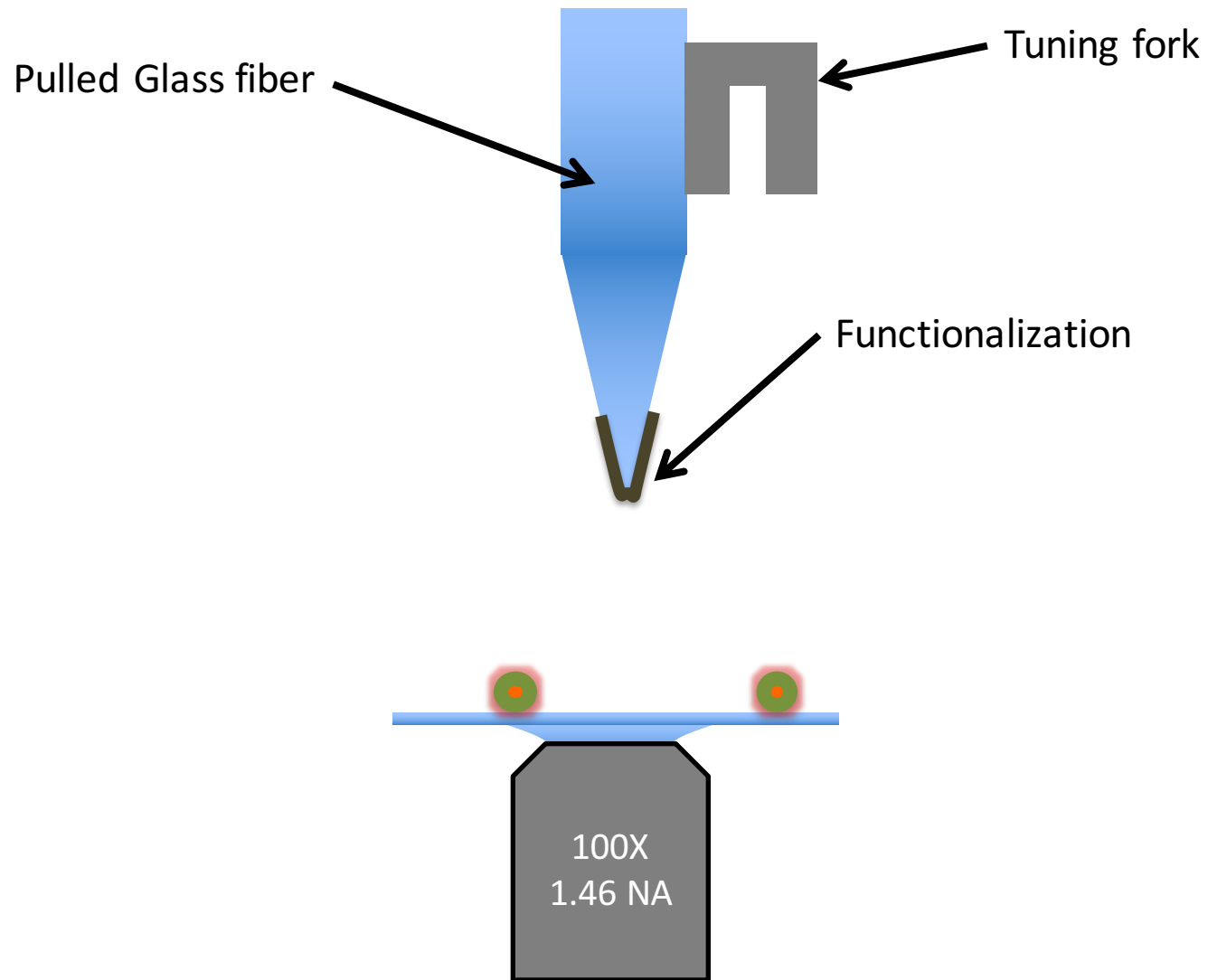


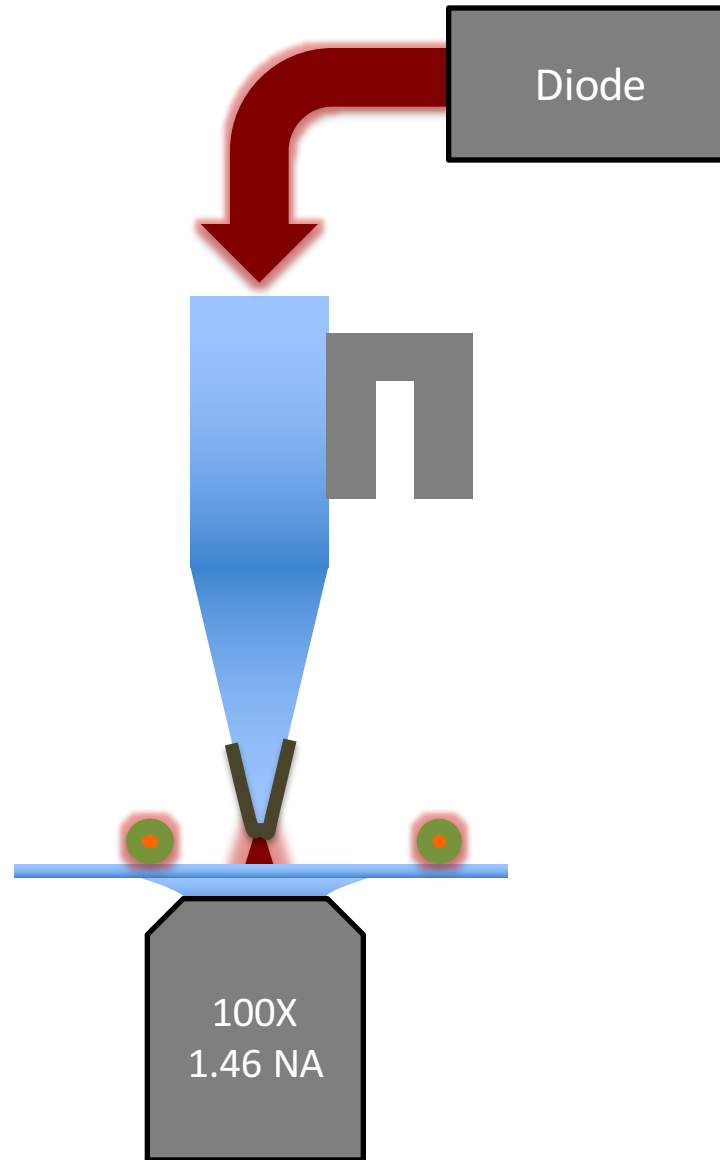


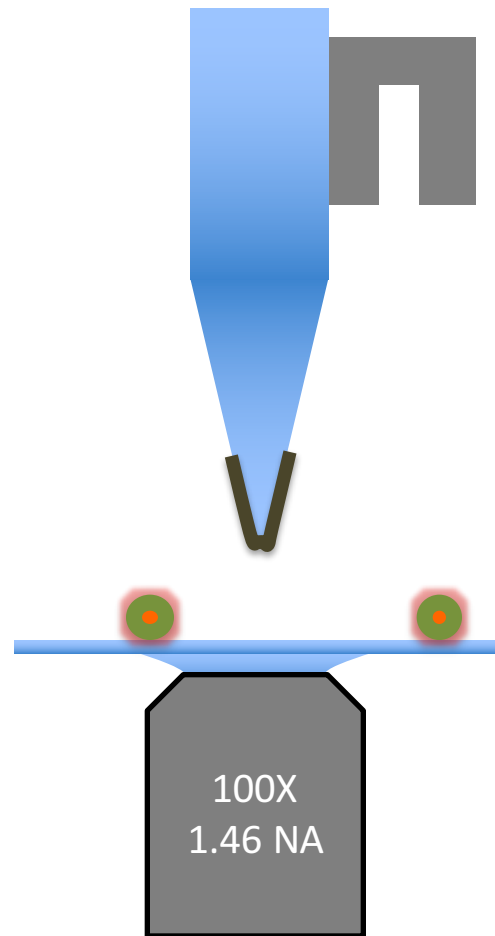
Colorized SEM image

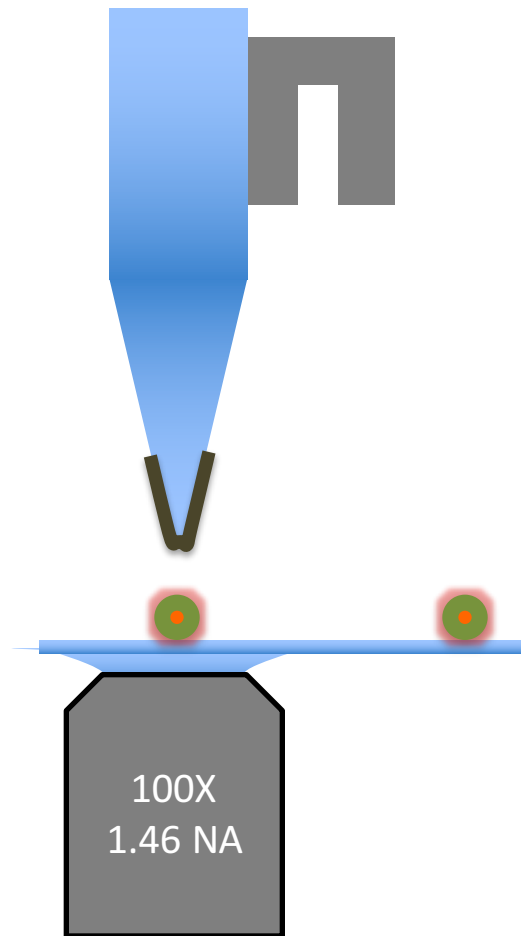


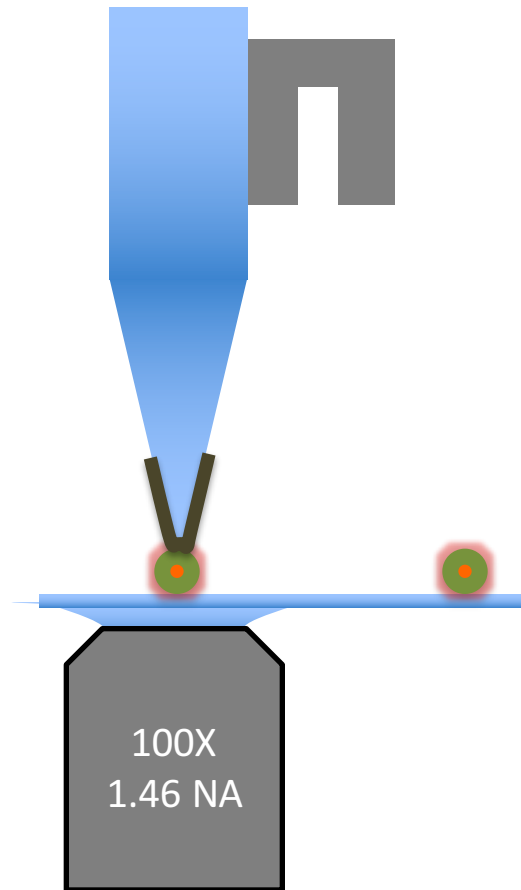


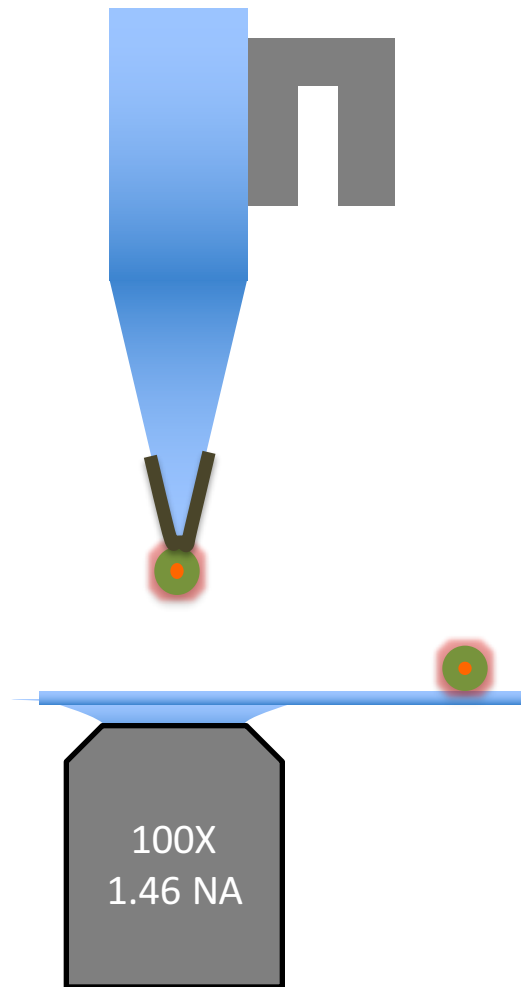


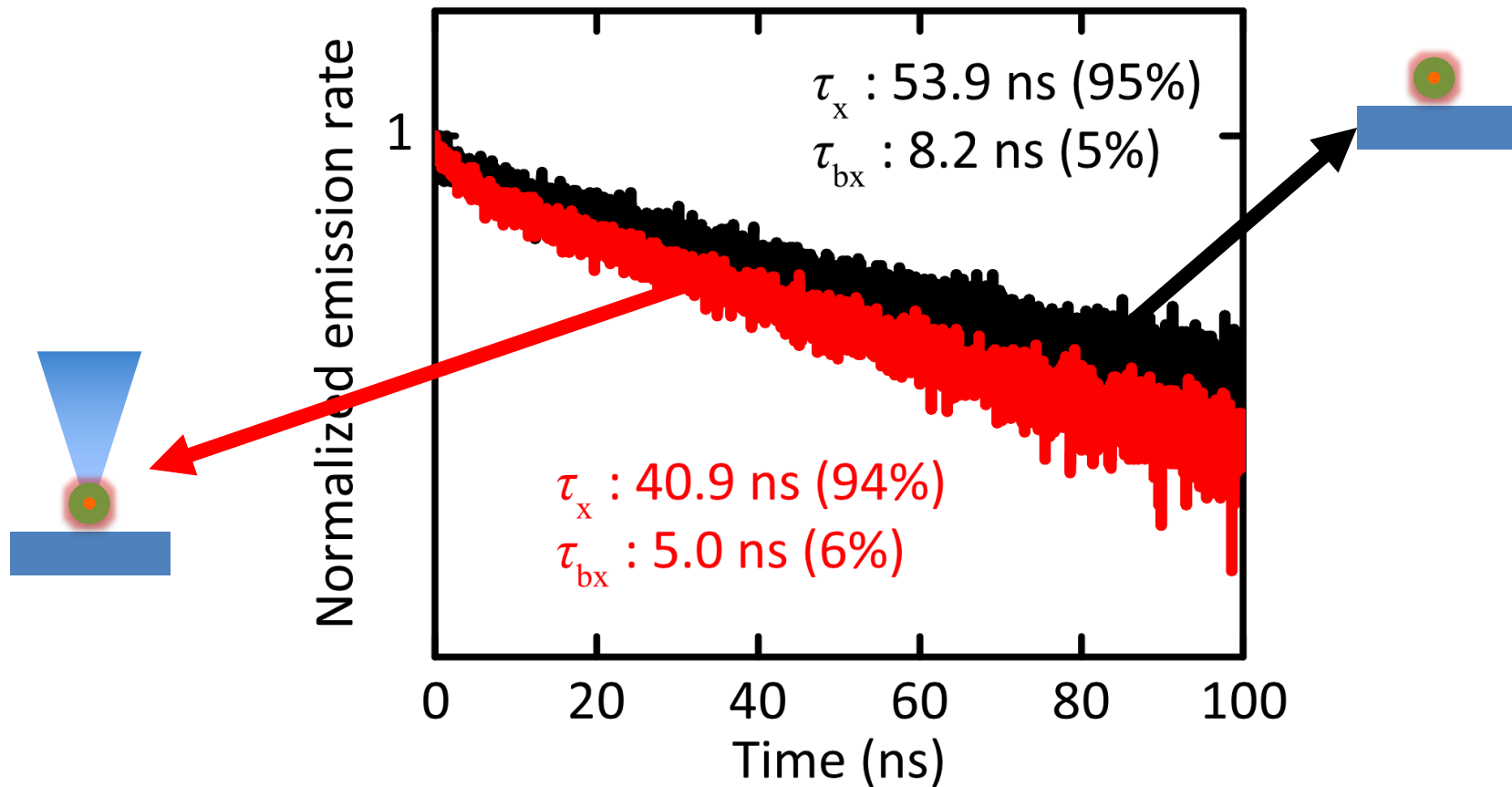


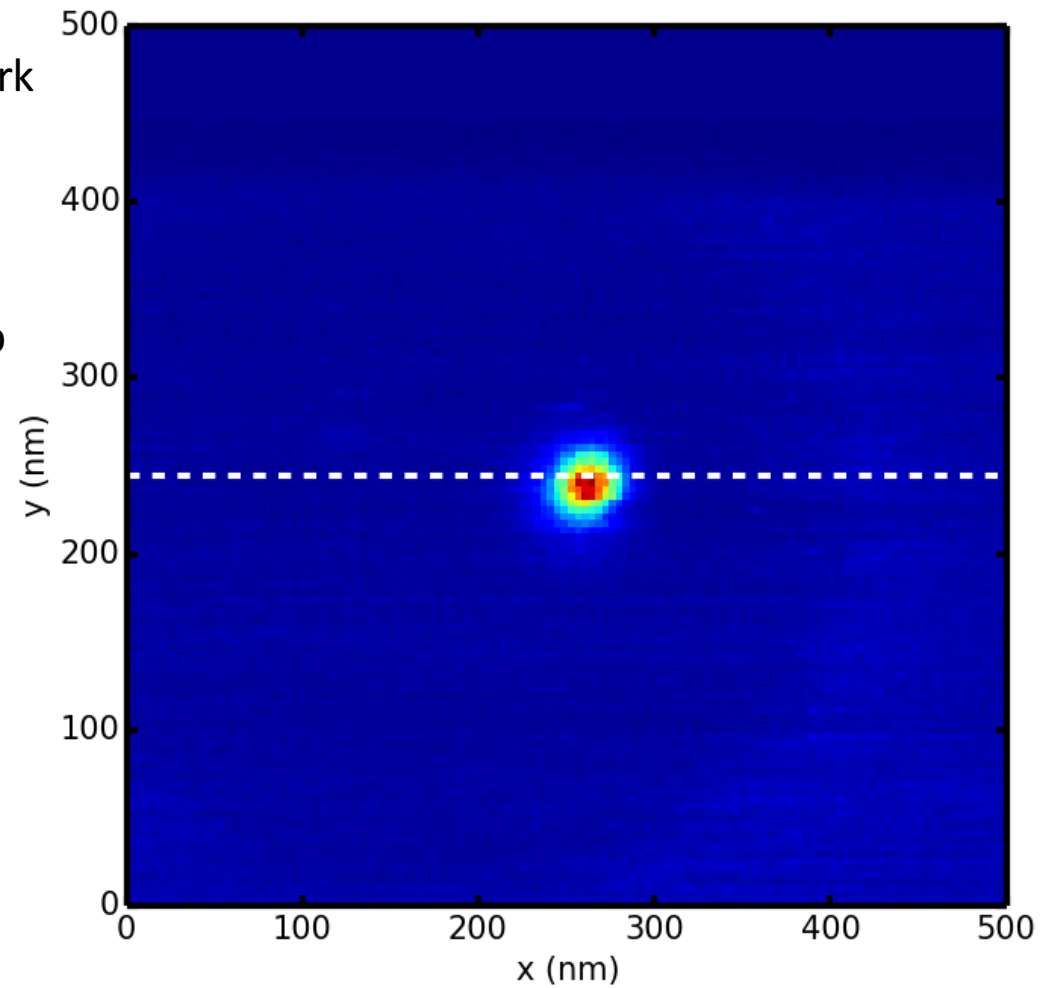
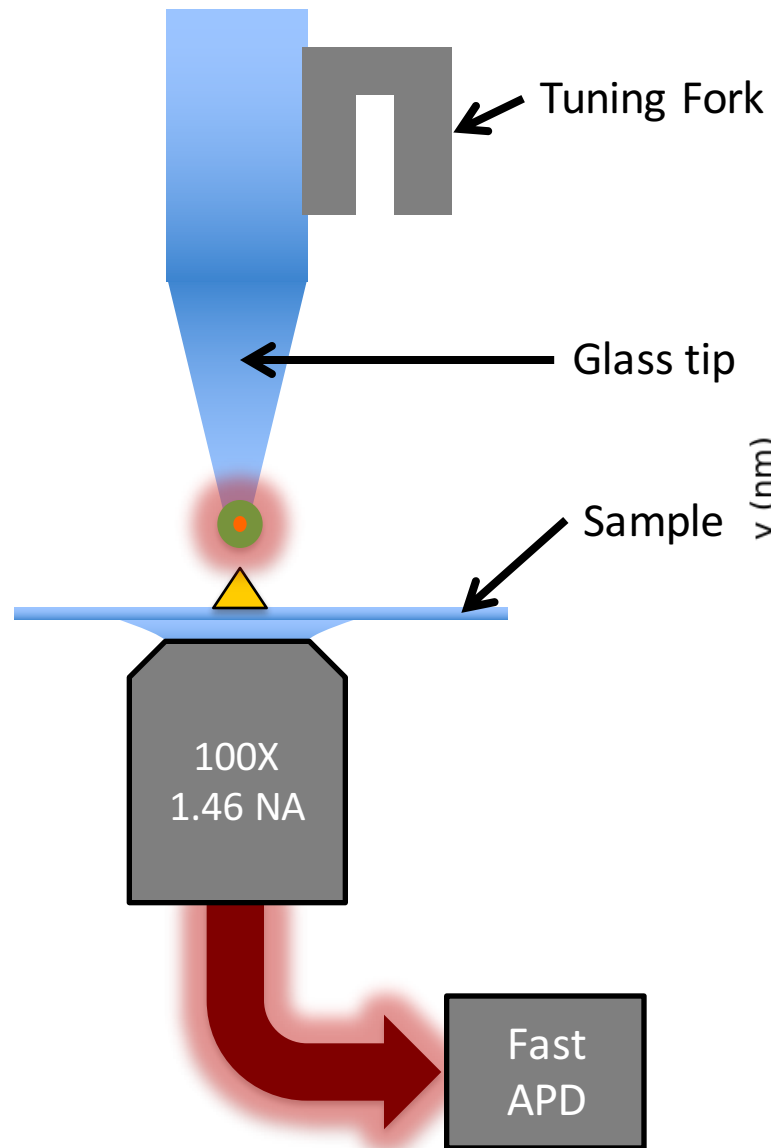




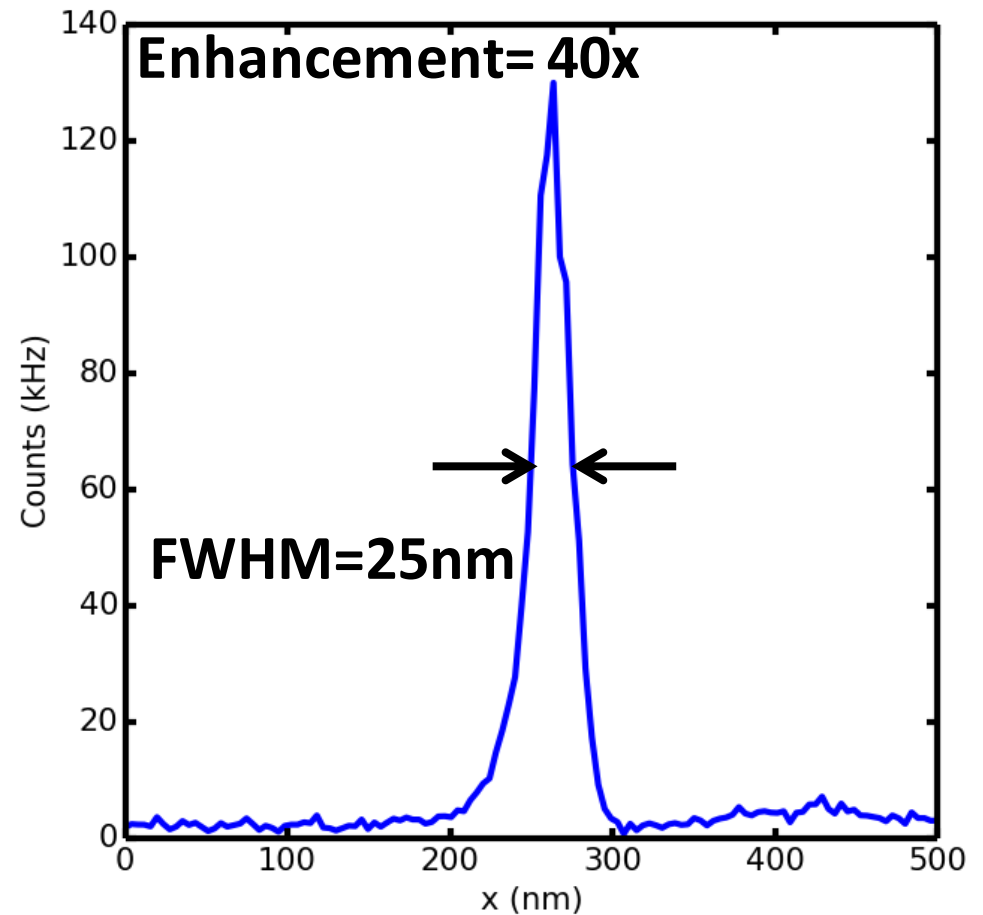
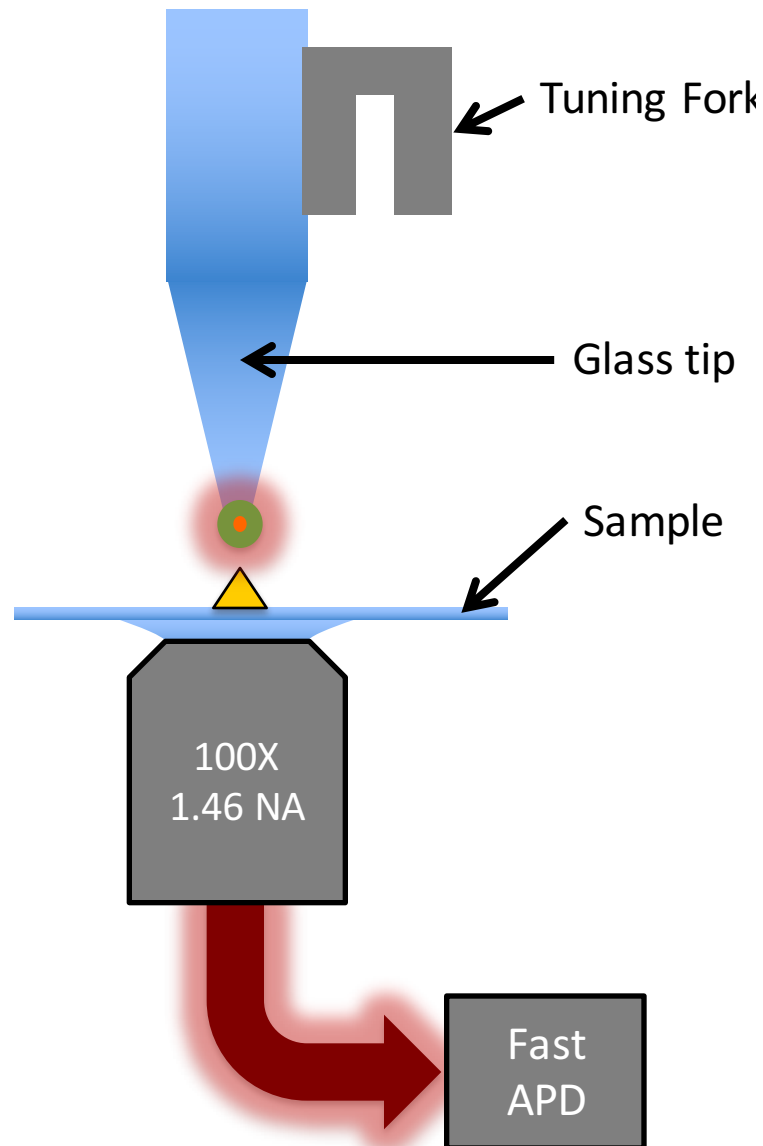




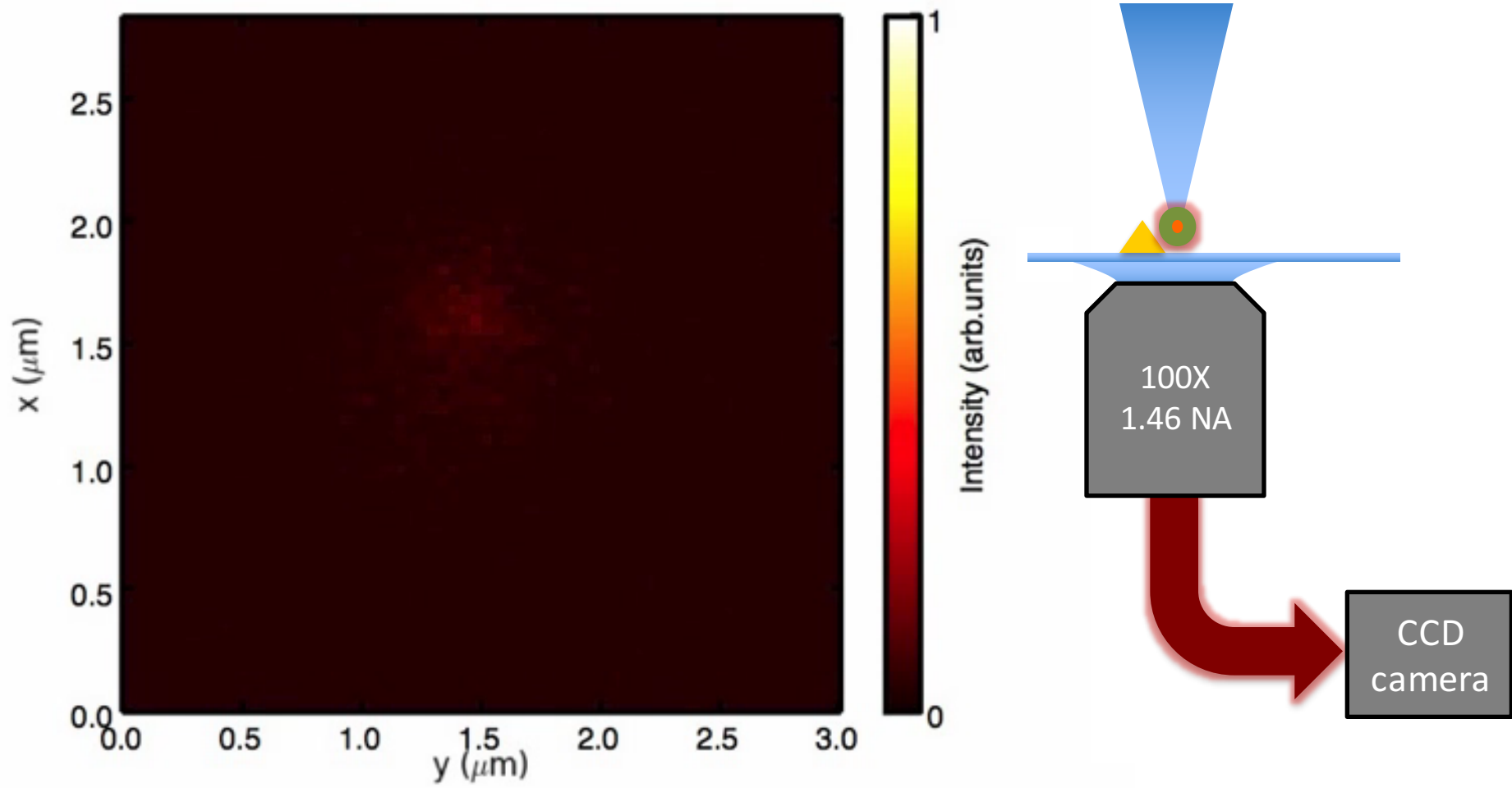




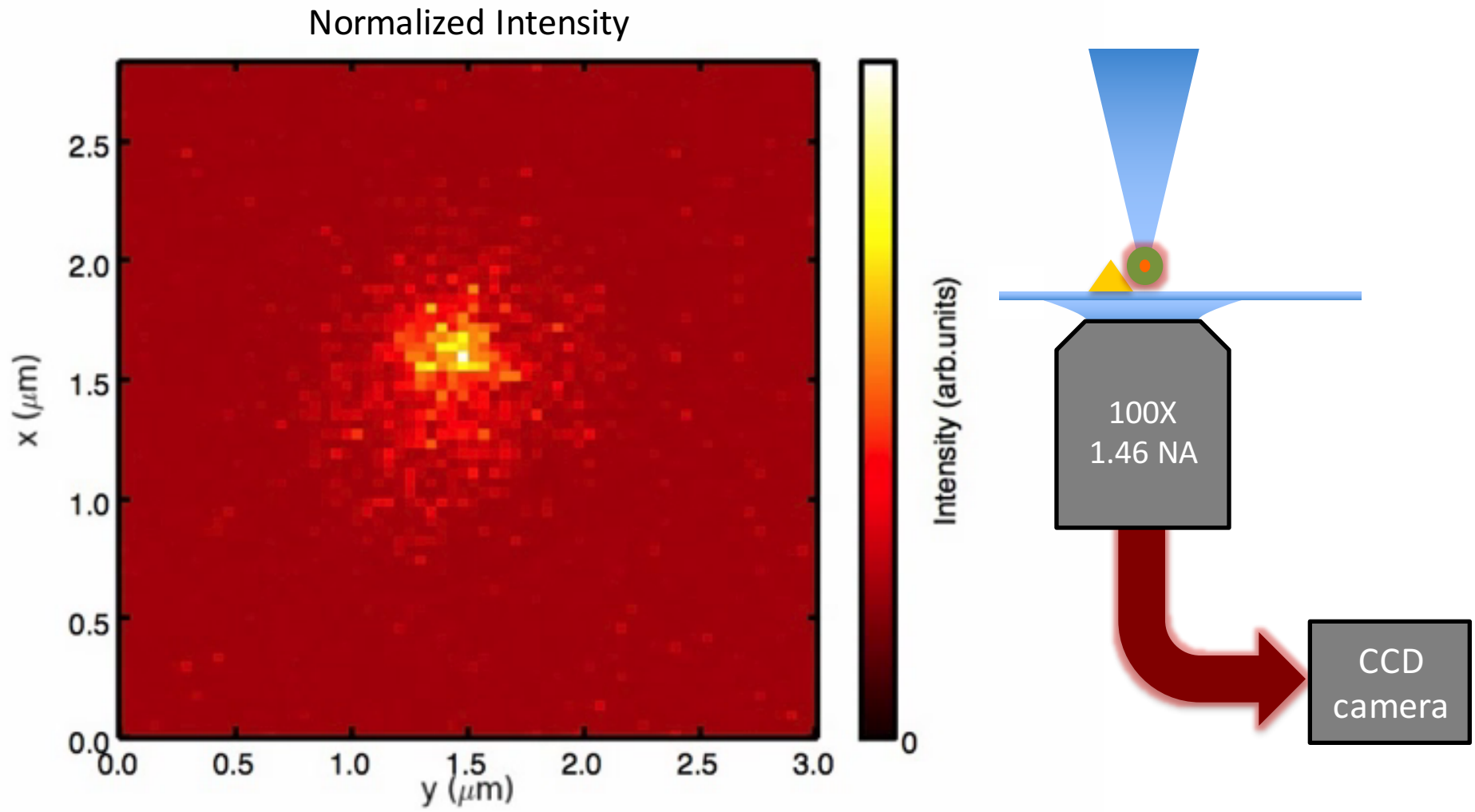
Scientific Report **7**, 42307 (2017)



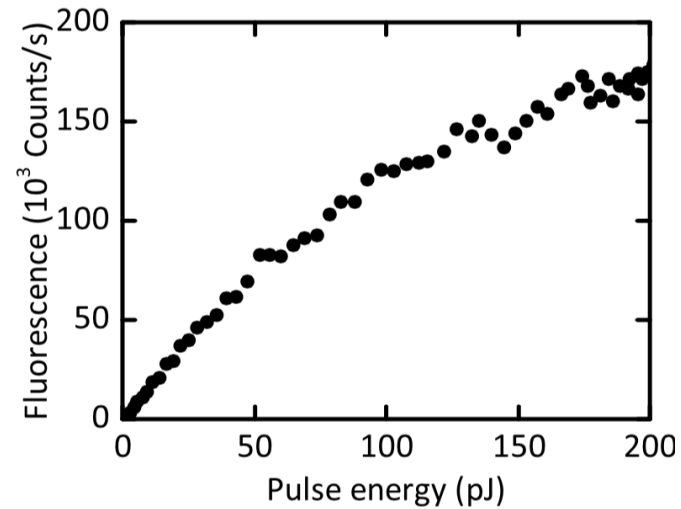
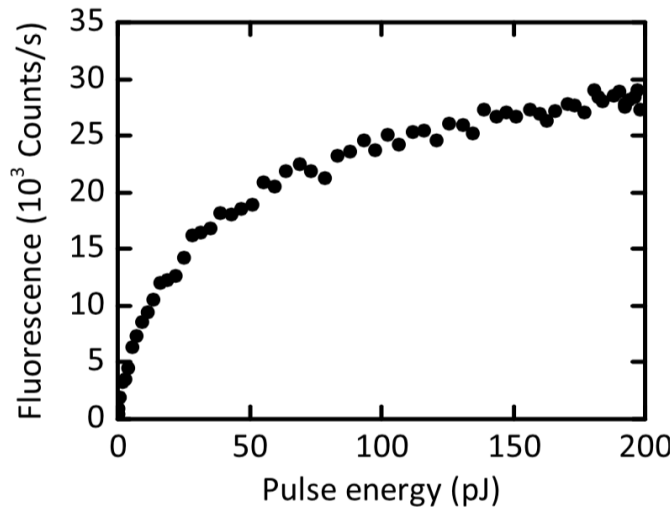
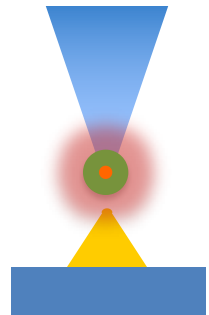
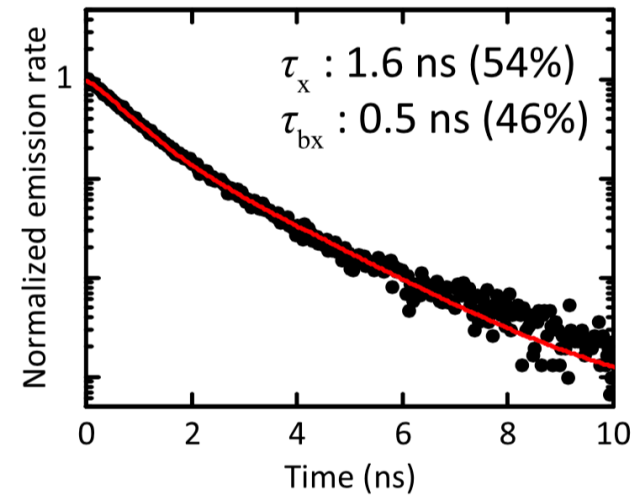
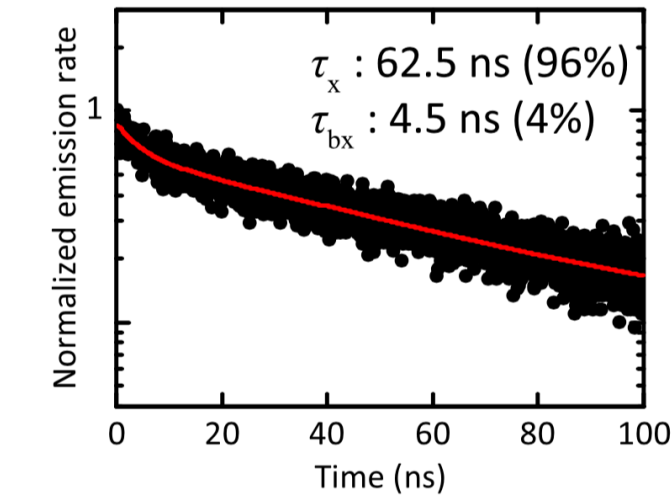
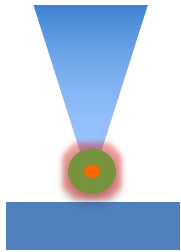
Scientific Report 7, 42307 (2017)

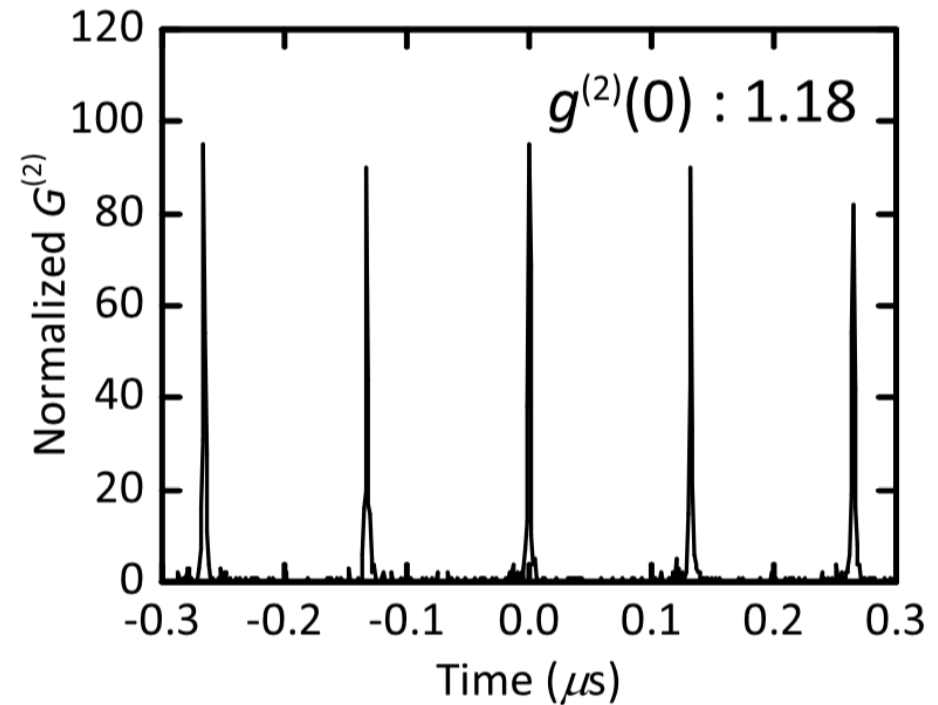
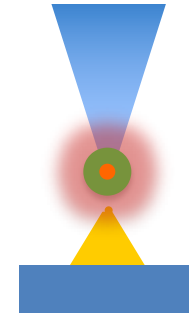
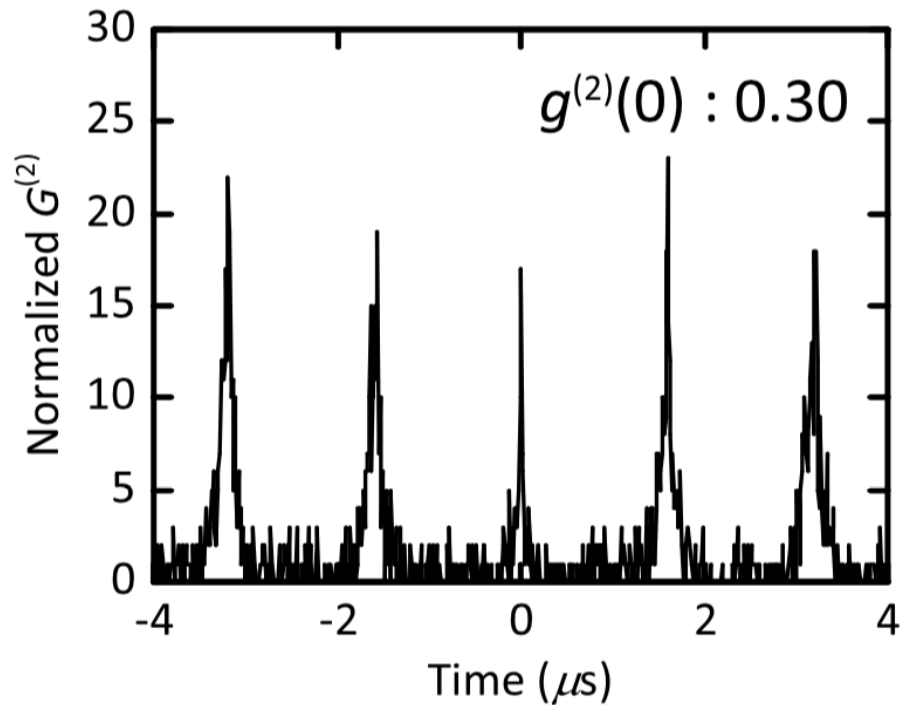
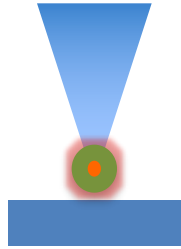


Scientific Report **7**, 42307 (2017)

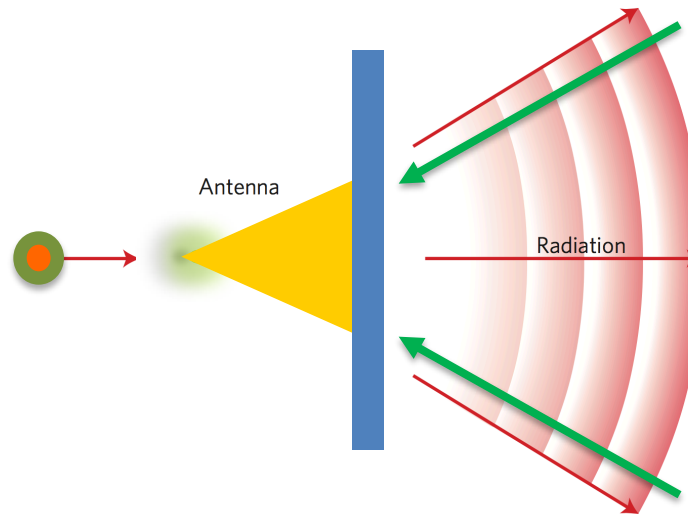


Scientific Report **7**, 42307 (2017)





	Qdot on glass QE	Antenna QE	Radiative enhancement	Non-Radiative enhancement
Mono exciton	22 ±3%	60 ±7 %	109 ±19	69 ±16
Bi exciton	6.5 ±1.5%	71 ±9 %	100 ±29	26 ±22



- Efficient Antenna
- Sub-wavelength spatial confinement
- Control of emission angular distribution
- Strong lifetime reduction
- Bright photon nano-source



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