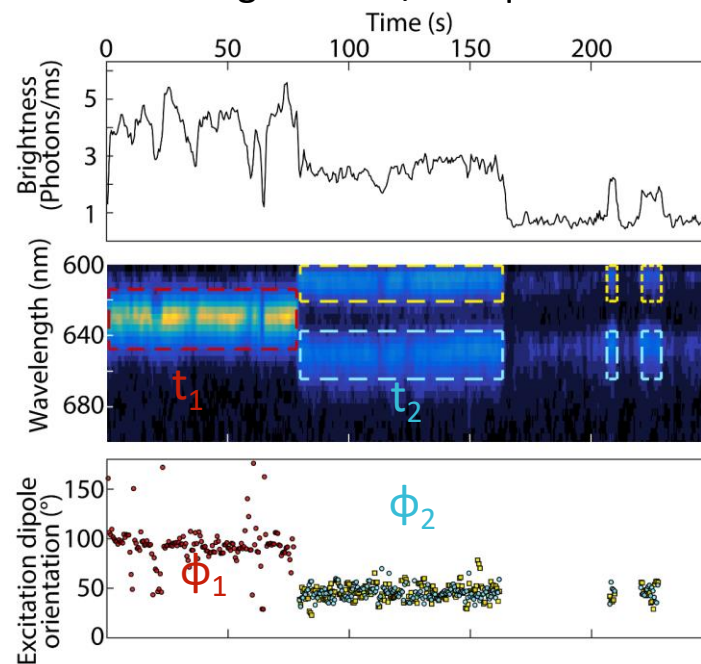


**Background:** Cryogenic single-molecule spectroscopy (SMS) is a powerful tool to observe heterogeneous photophysical states. Cryogenic electron tomography (CET) is a complementary technique that provides detailed structural information. We combine these two methods to correlate structures with their photophysical states. In this proof of principle demonstration we apply the technique to CdSSe/ZnS quantum dots and identify a previously unreported spectral splitting behavior.

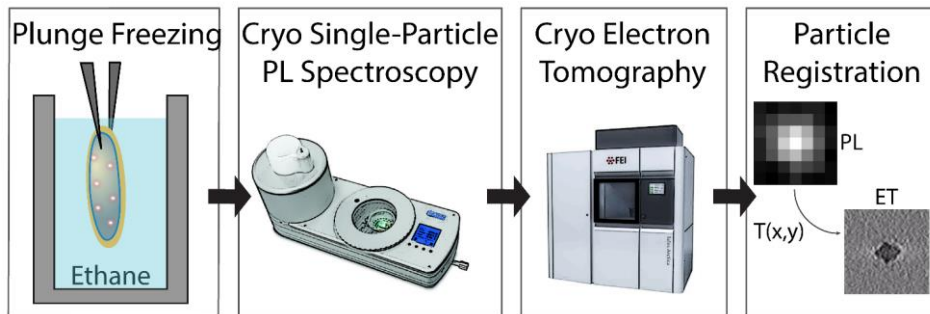
## Highlights:

- Simultaneous observation of brightness, excitation dipole in-plane orientation, and emission spectrum
- Follow up CET with sub nm resolution
- Can correlate SMS and CET at the single-particle level

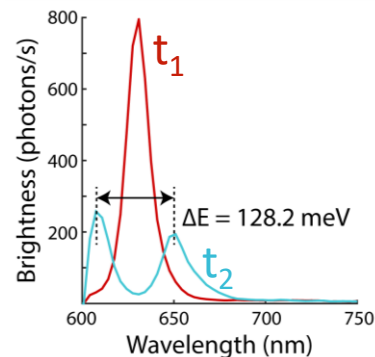
## SMS of single CdSSe/ZnS quantum dot



## correlative workflow



## novel spectral splitting



## correlated SMS and CET

