New routes to reduced-symmetry plasmonics

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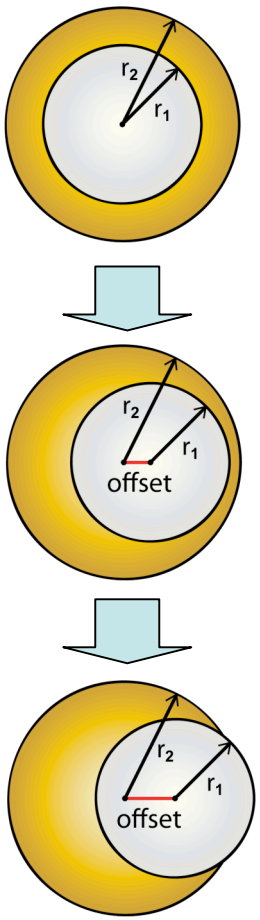
- All complex plasmonic structures support both bright and dark modes

Stockman, M. I.; Faleev, S. V.; Bergman, D. J., *PRL* **2001,** *87*, 167401.

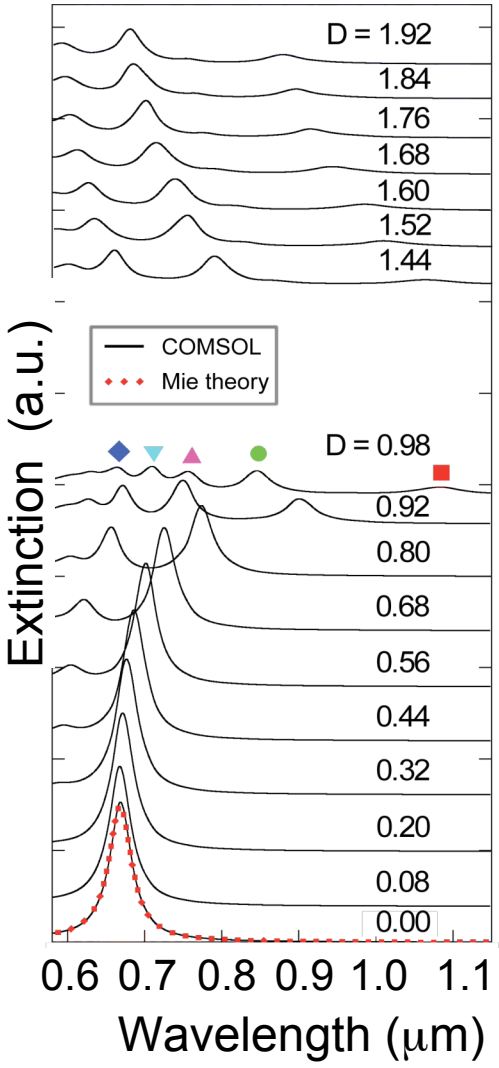
- Symmetry-breaking allows for the excitation of previously dark modes, which appear in optical response
- These new resonances can ***interact*** and support coherent coupled-oscillator physics: EIT, Fano Resonances, Sub- and superradiance (atomic physics redux!)

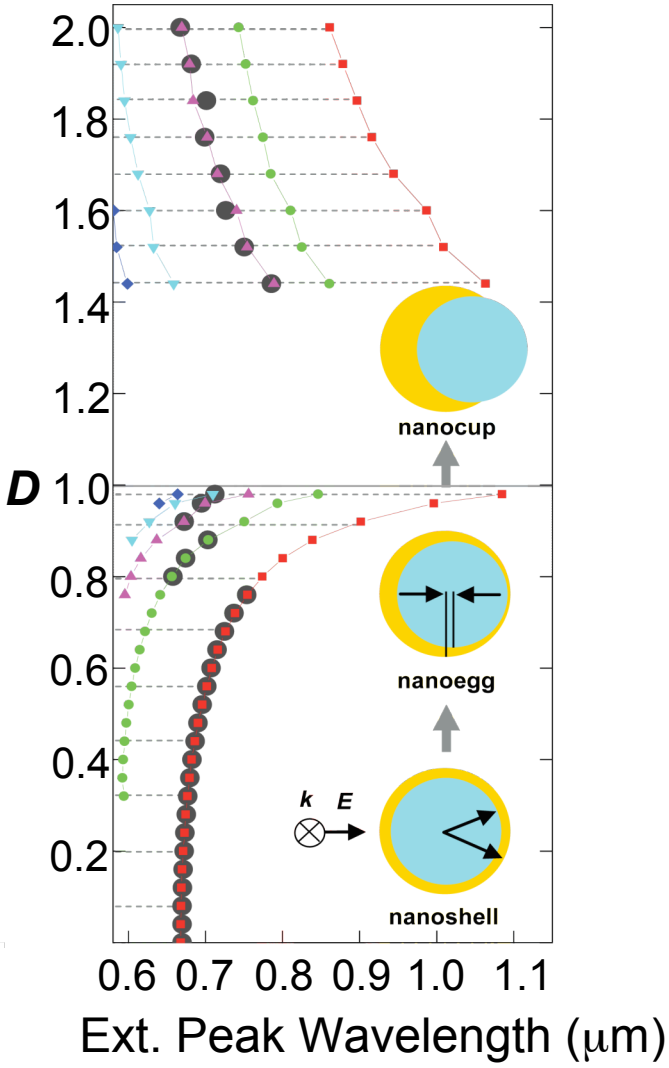
Nanoshell to Nanoegg to Nanocup

COMPLEX to REDUCED SYMMETRY to ELEMENTARY nanostructure



$$D = offset/(r_2 - r_1)$$

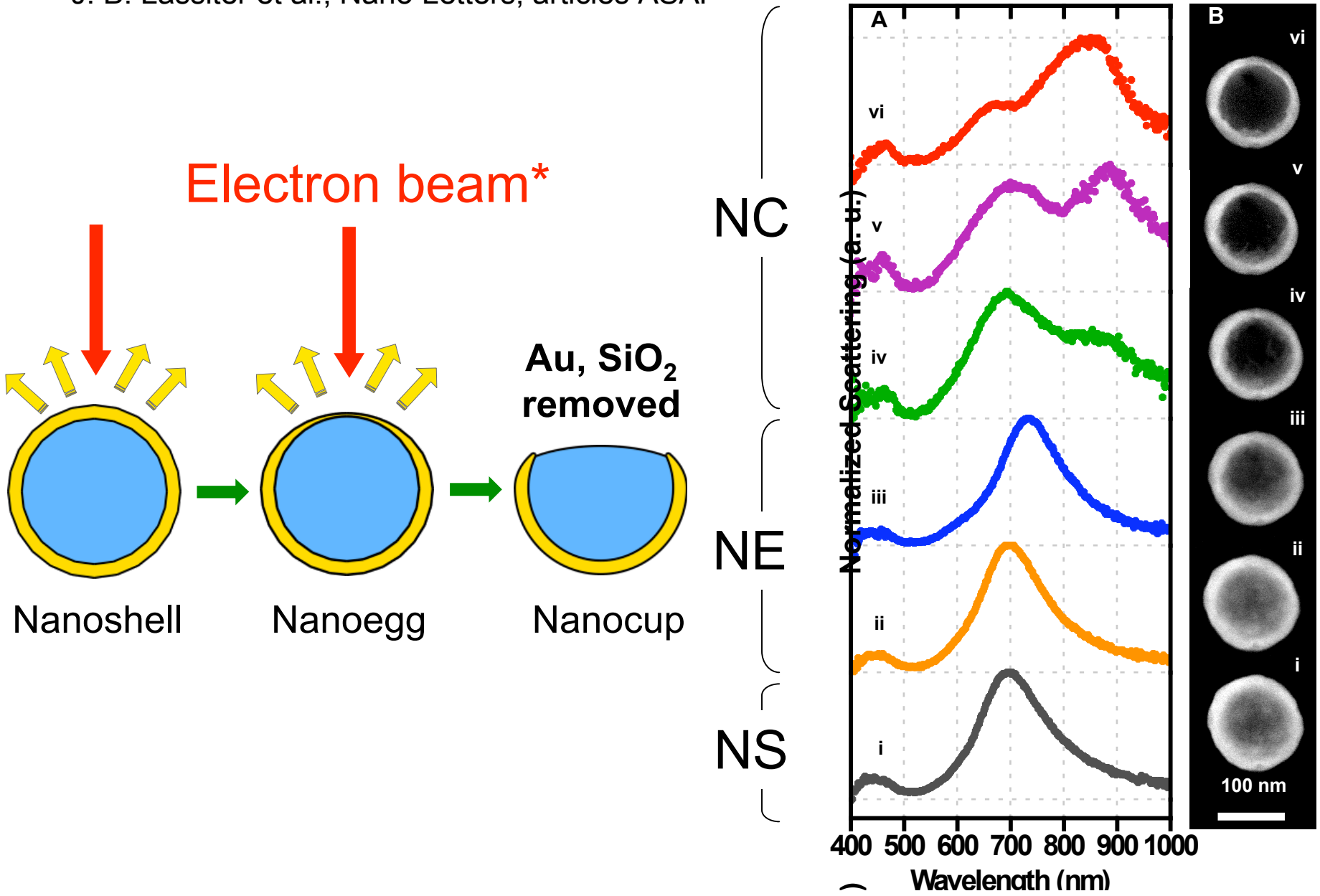




Mark Knight and N. J. Halas, N. J. Phys. 10, 105006 (2008).

Controlled ablation of individual plasmonic nanoparticles

J. B. Lassiter et al., Nano Letters, articles ASAP



Plasmonic Nanocup Modes

Nikolay Mirin and N. J. Halas, “Light-bending Nanoparticles”, Nano Letters 9, 1255-1259 (2009)