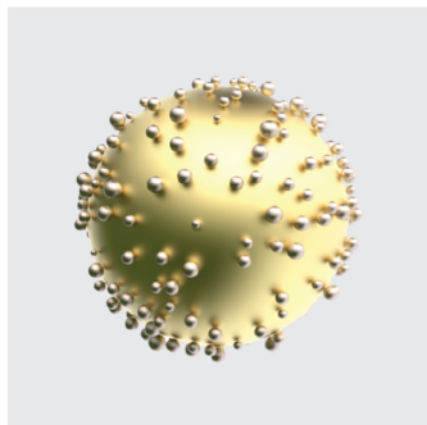




# NANO-OPTICS OF NANOPARTICLE ASSEMBLIES

NANO-OPTICS.AC.NZ



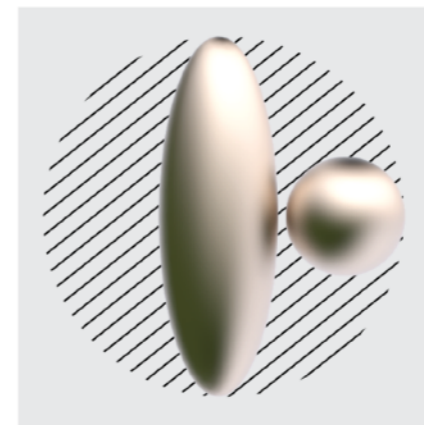
CORE-SATELLITES



AU@PD TRIMER



AU NANOROD HELIX



RAYLEIGH HYPOTHESIS



AU NANOSTAR



PHOTONIC  
CRYSTALS



TWEEZERS

FAR-FIELD



CHIRAL PHOTONICS

QUANTUM  
OPTICS

LASER

FIBRES

METAMATERIALS

INVISIBILITY CLOAK

DEAD

BRANCH

SCANNING TIP  
MICROSCOPY

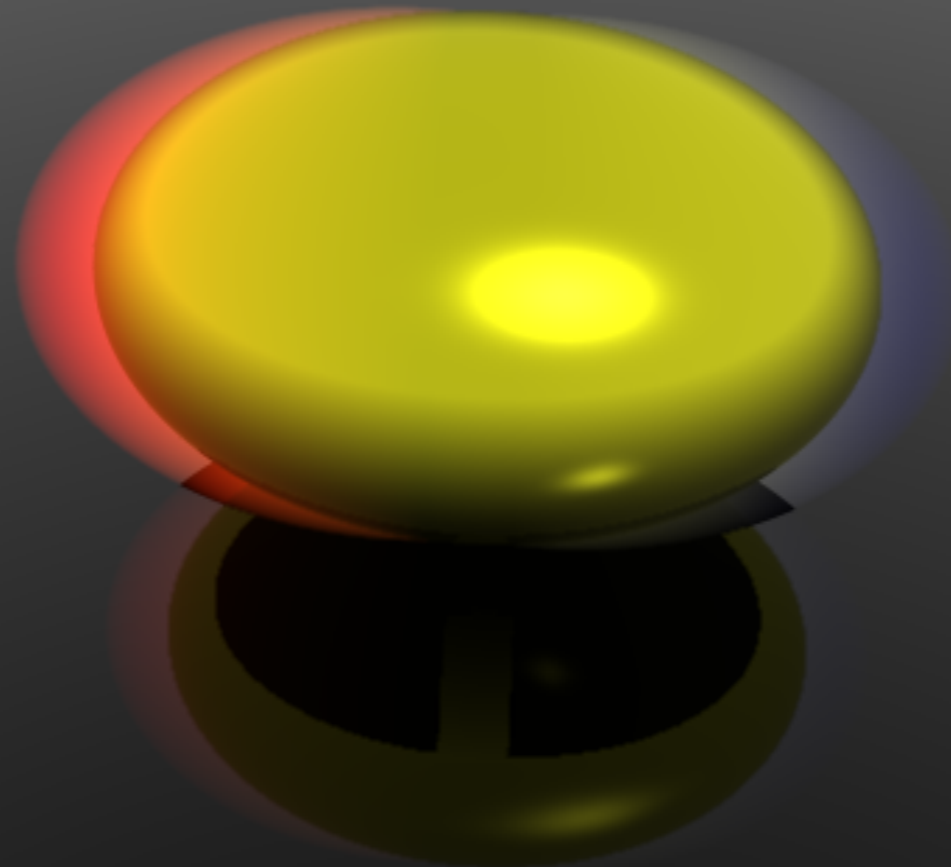
NEAR-FIELD



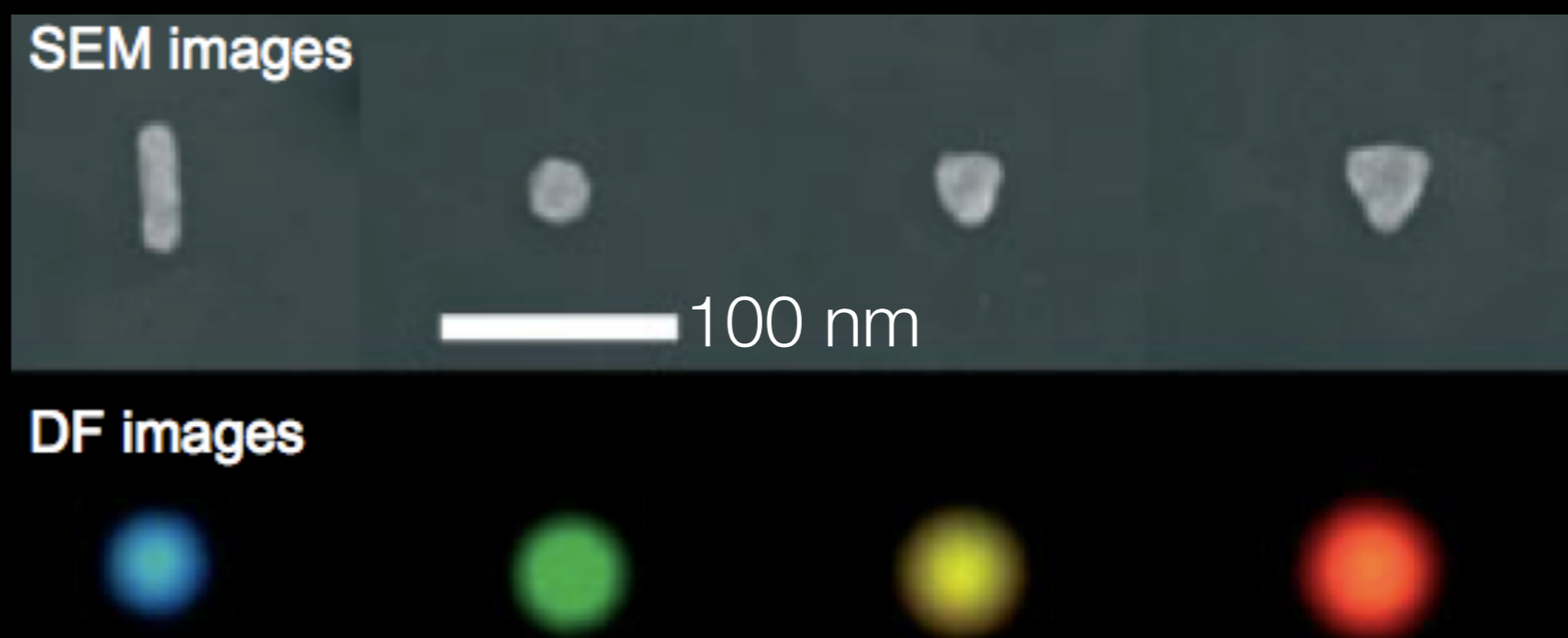
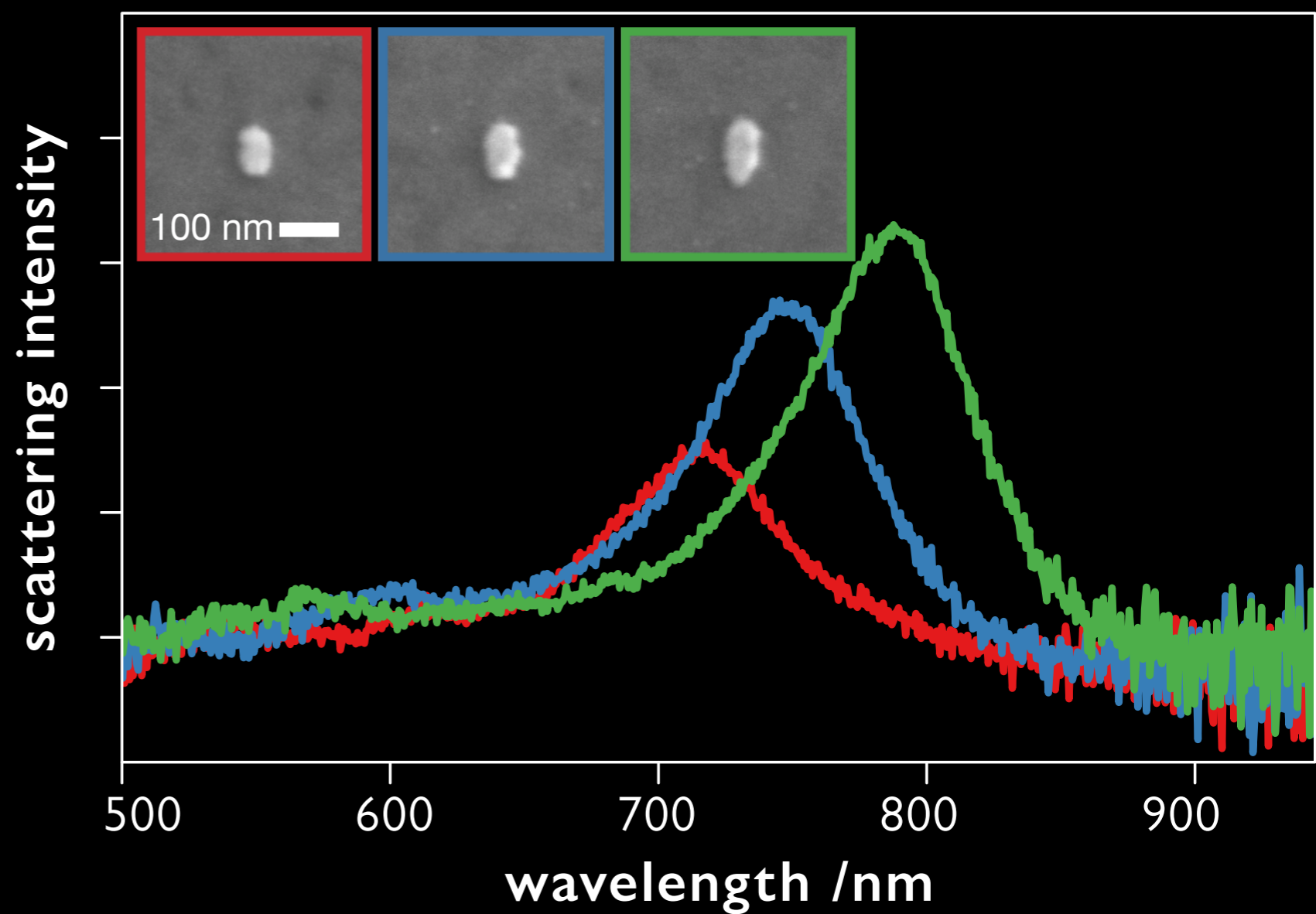
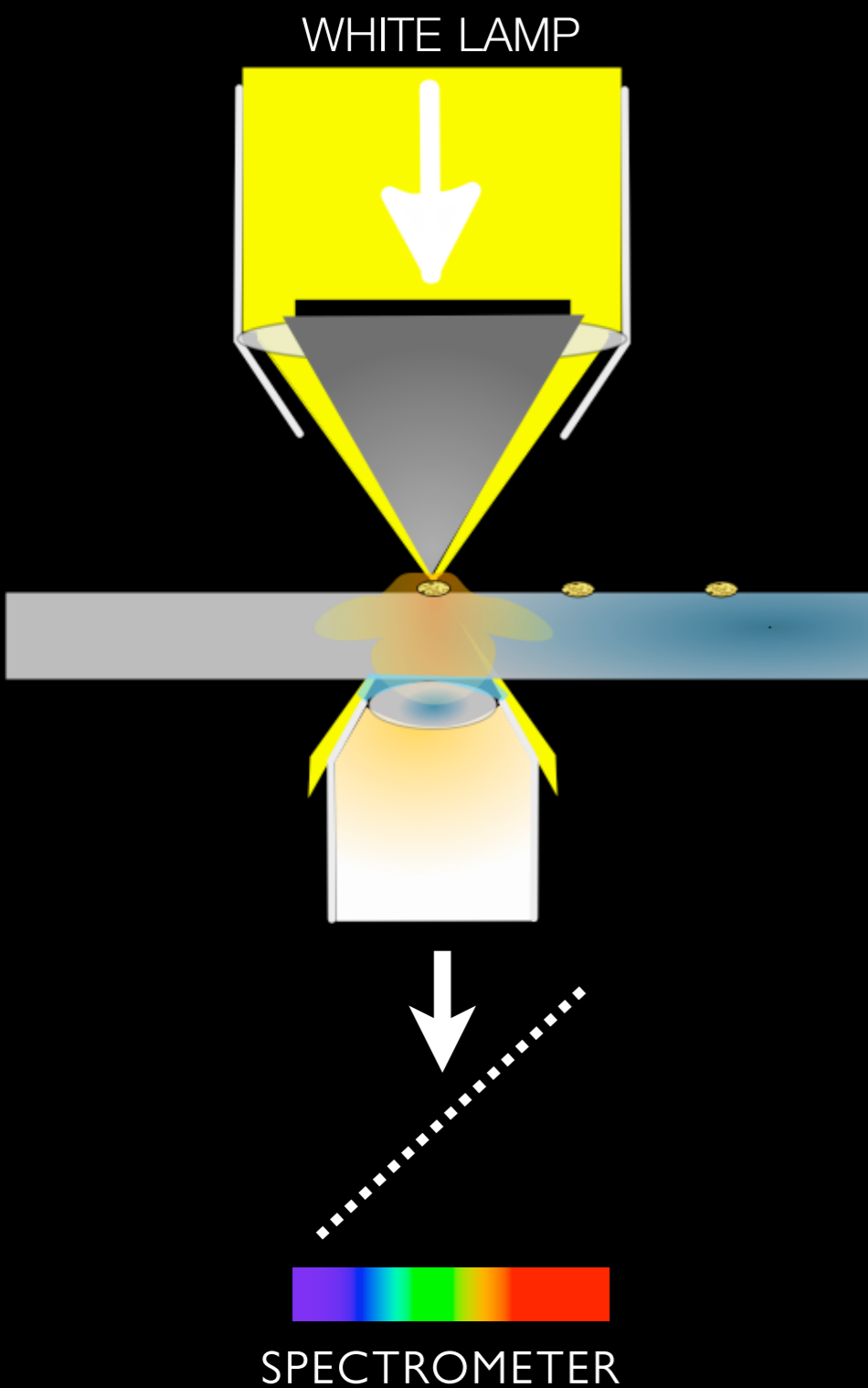
Modern Optics



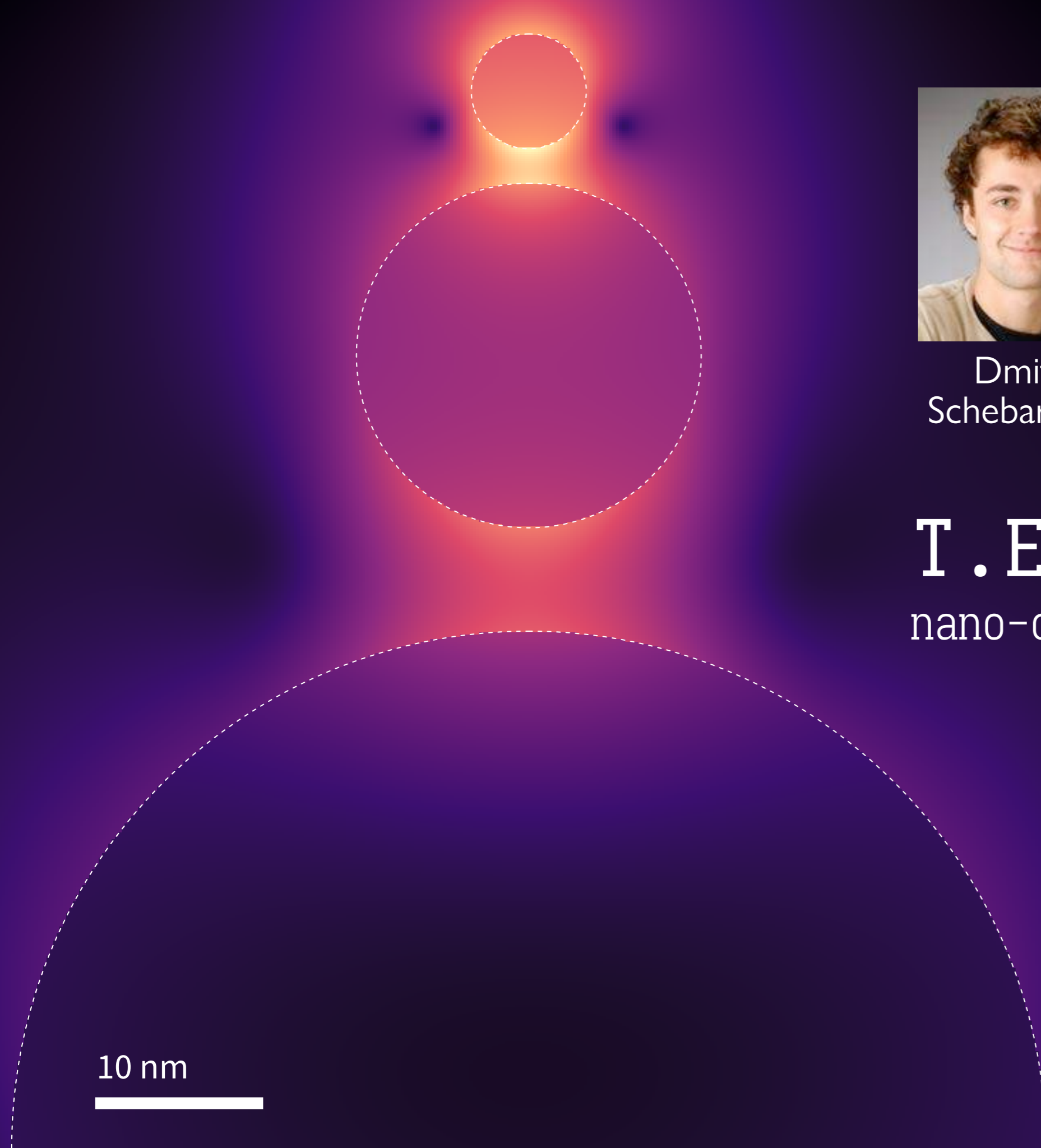
NANO-ANTENNAS,  
FOR LIGHT



# NANO-ANTENNAS, FOR LIGHT







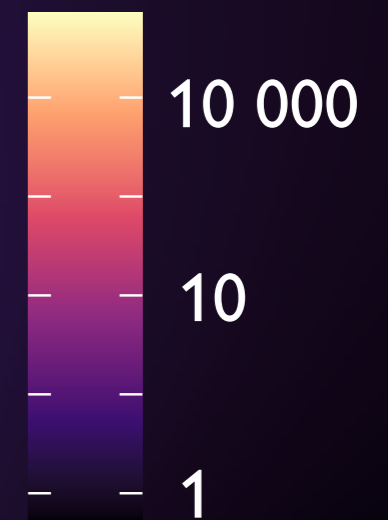
10 nm



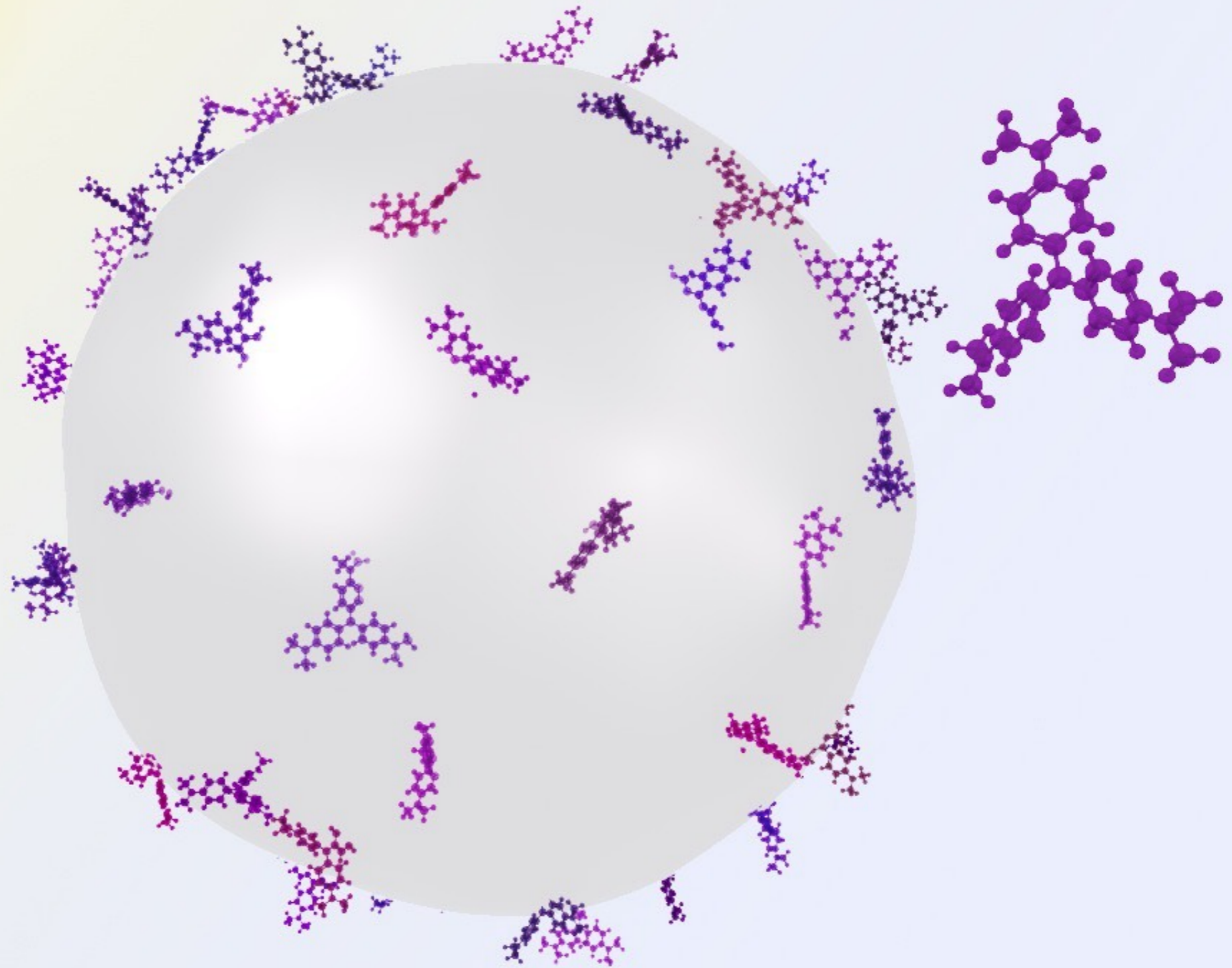
Dmitri  
Schebarchov      Atefeh  
Fazel-Najafabadi

**T.E.R.M.S.**  
[nano-optics.ac.nz/terms](http://nano-optics.ac.nz/terms)

Intensity



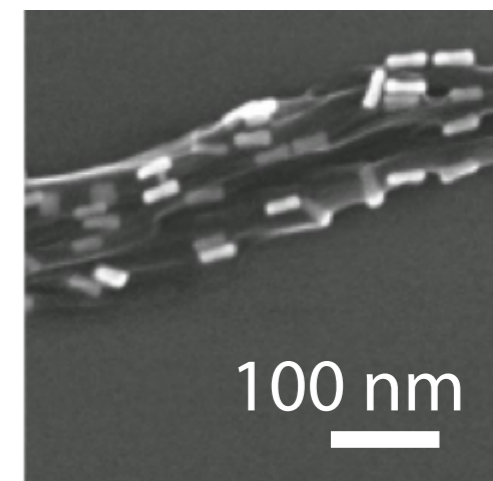
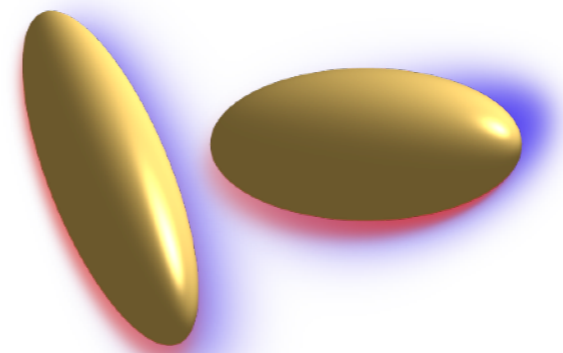
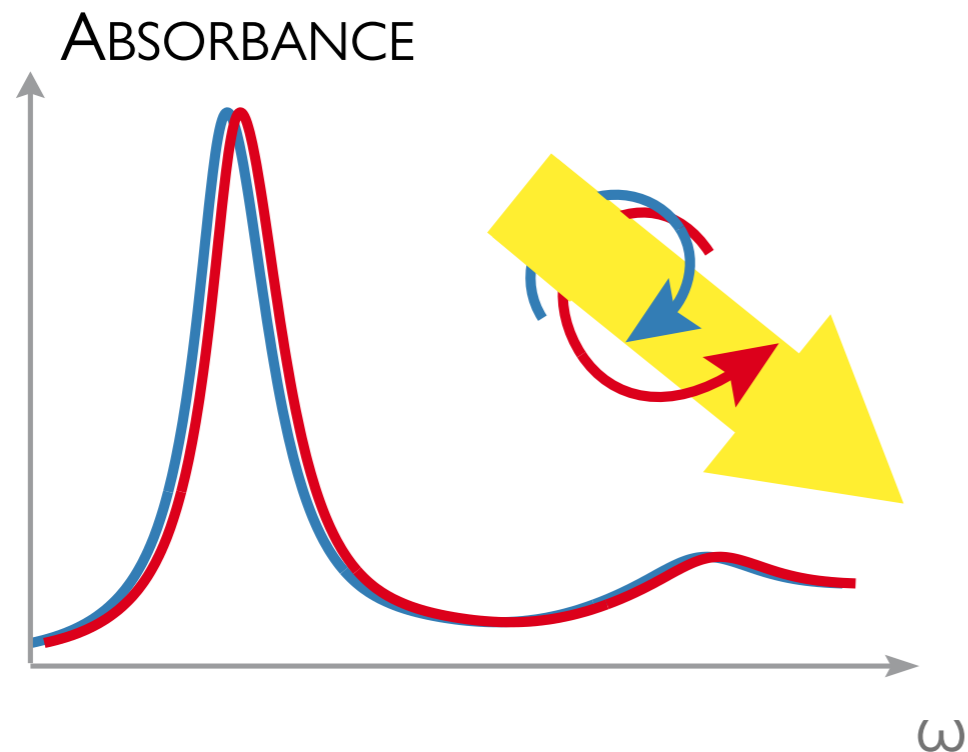




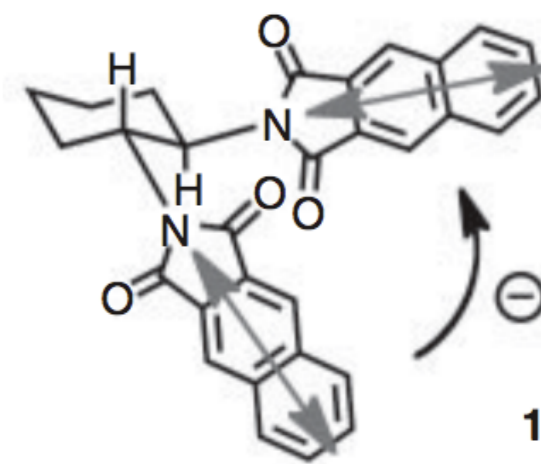
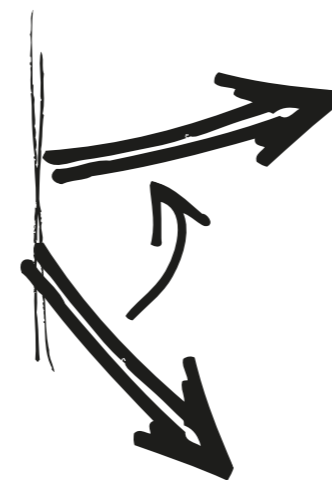
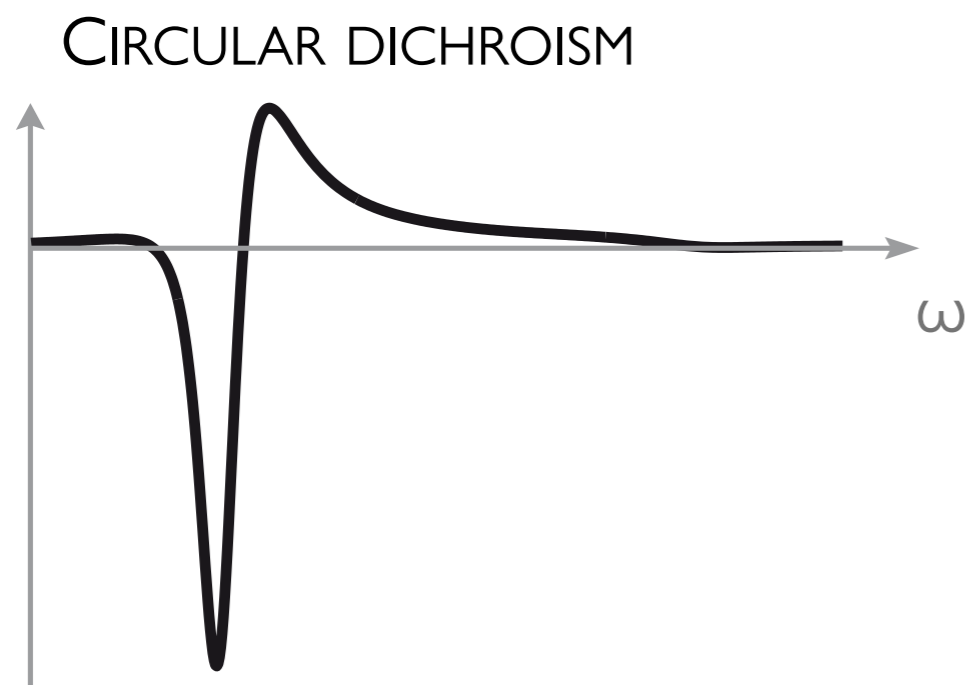
# SURFACE-ENHANCED SPECTROSCOPIES



# GIANT CIRCULAR DICHROISM WITH ARTIFICIAL NANOSTRUCTURES

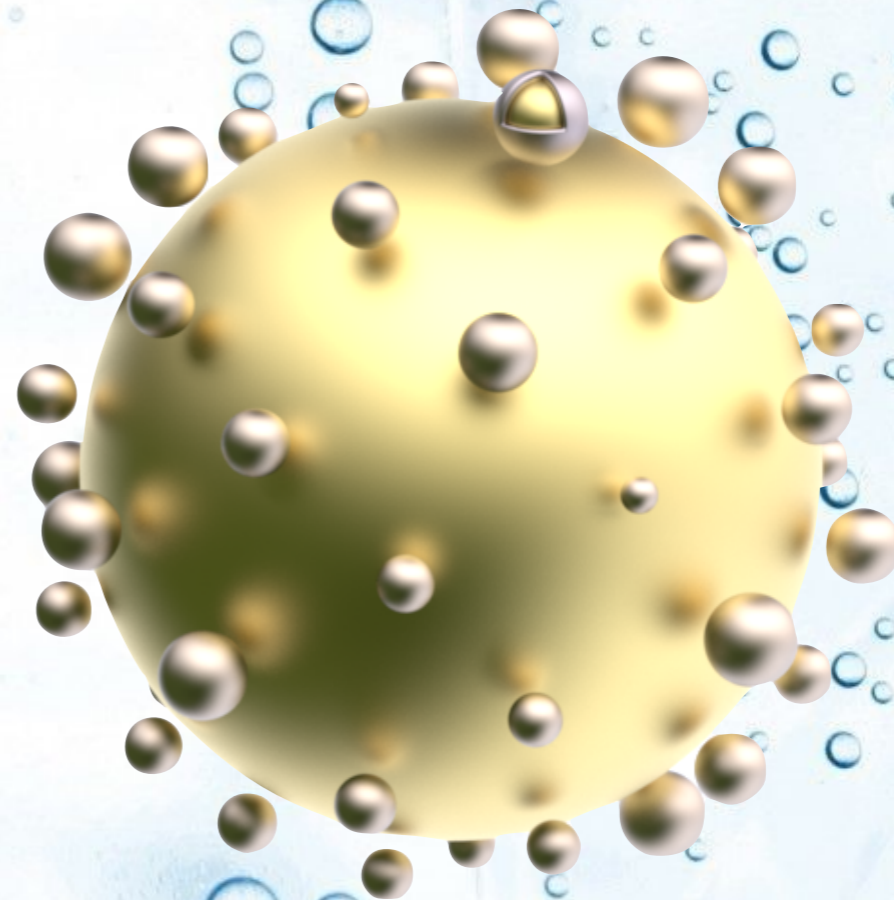
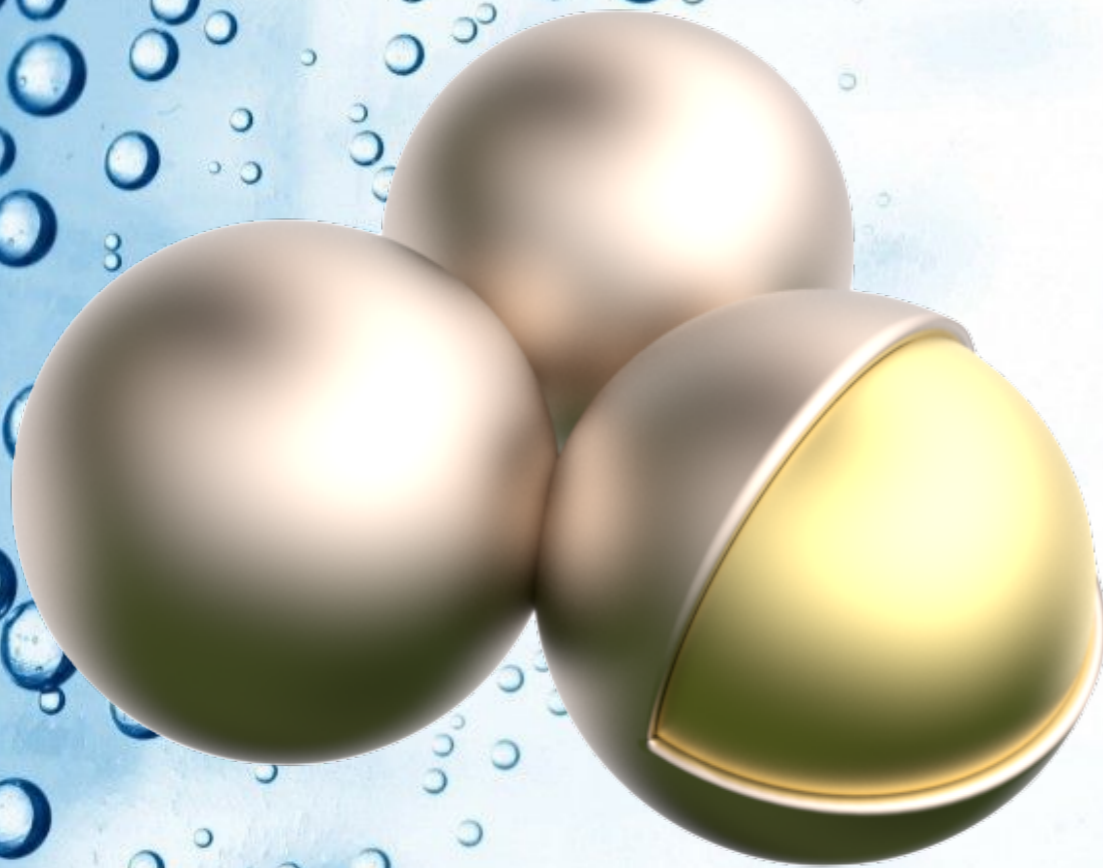


mimicking "exciton coupling"





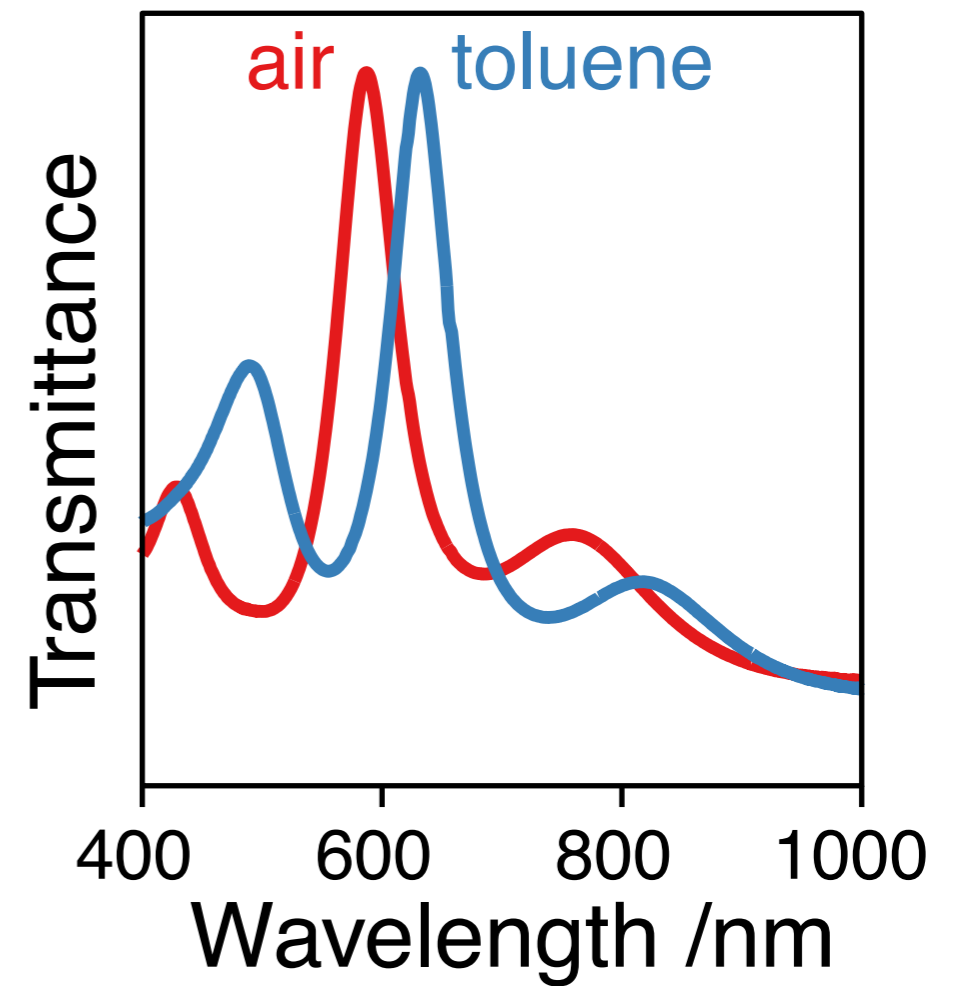
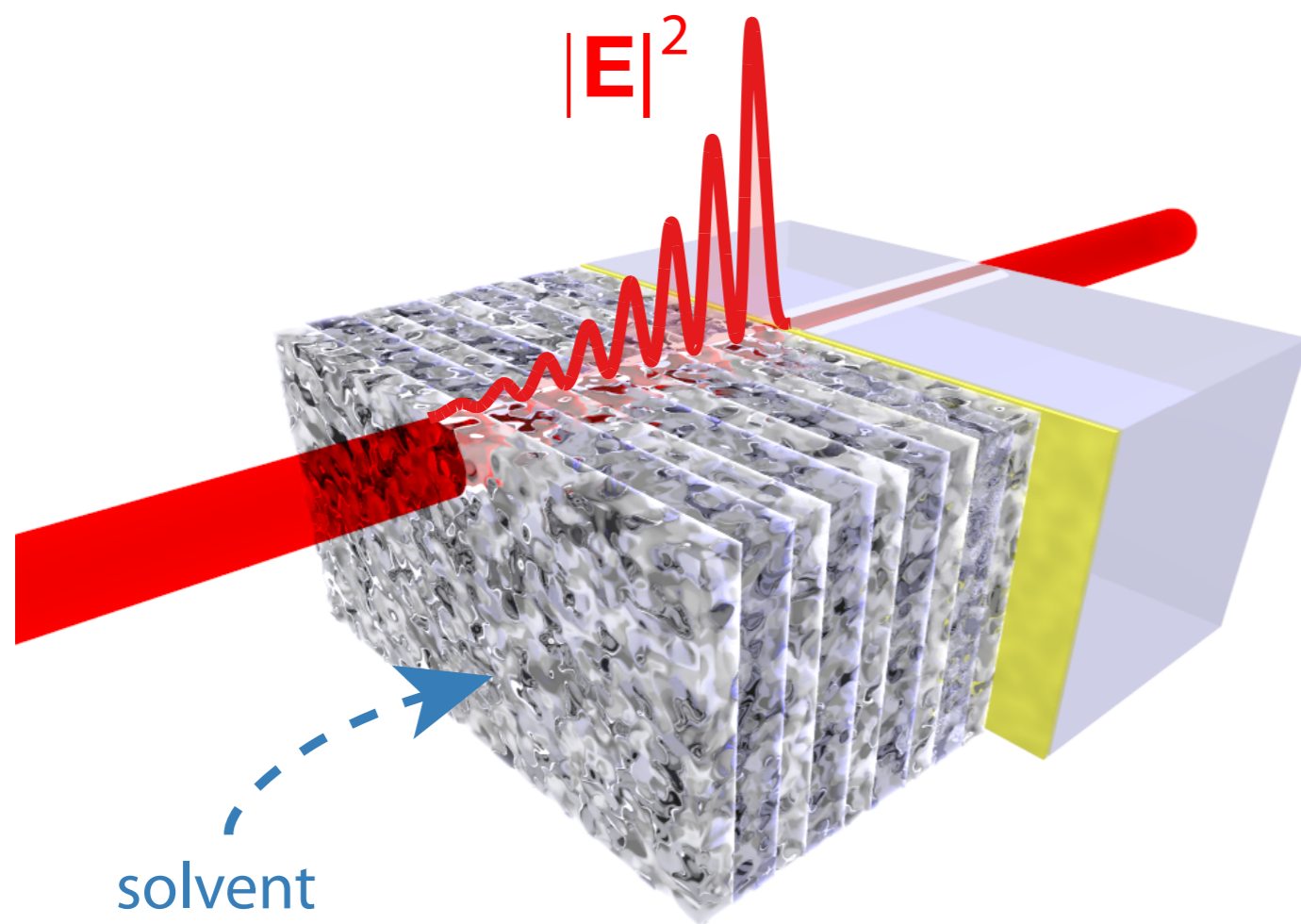
# HYBRID **PHOTOCATALYSTS**



*with Emiliano Cortés (München, Germany)*



# 2D: OPTICAL SENSING WITH TAMM PLASMONS



*with Paula Angelomé (Buenos Aires, Argentina)*





MORE INFO:  
[nano-optics.ac.nz](http://nano-optics.ac.nz)

# ACKNOWLEDGMENTS



Eric Le Ru, Pablo Etchegoin  
Atefeh Fazel-Najafabadi  
Dmitri Schebarchov



Andrés Guerrero-Martínez  
Luis Liz-Marzán  
Javier García de Abajo



Emiliano Cortés  
Alejandro Fainstein  
Paula Angelomé



Te Mana  
Tangata Whakawhanake  
**MacDiarmid  
Institute**  
Advanced Materials  
& Nanotechnology



**DODD-WALLS CENTRE**  
for Photonic and Quantum Technologies

**RUTHERFORD**  
DISCOVERY FELLOWSHIPS

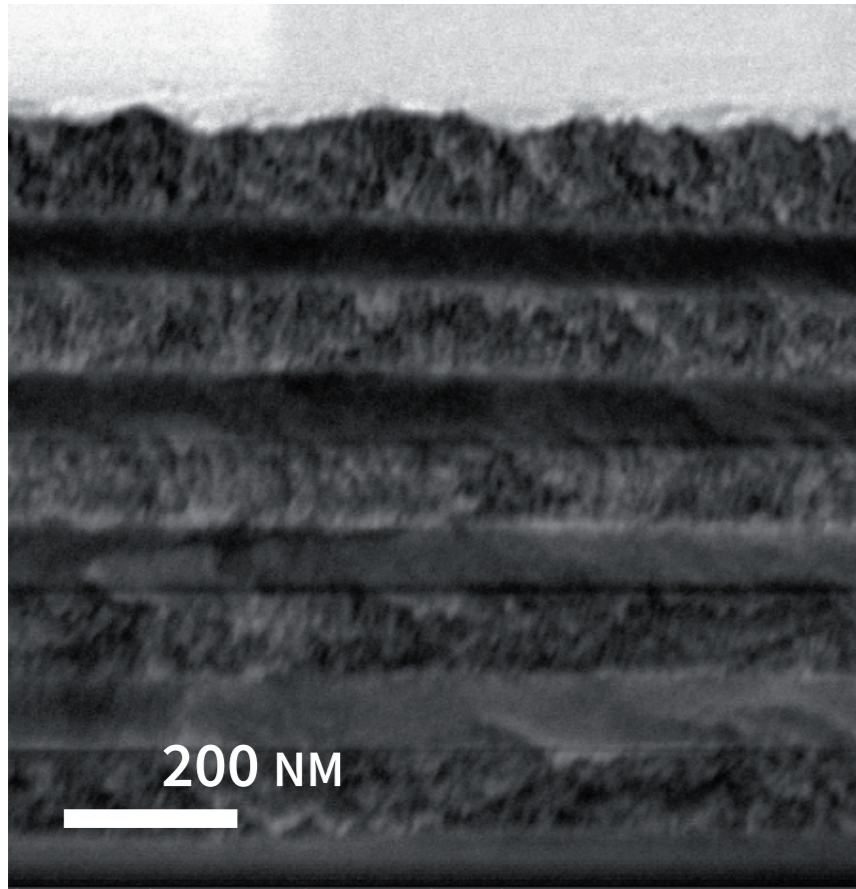
ROYAL  
SOCIETY  
TE APĀRANGI



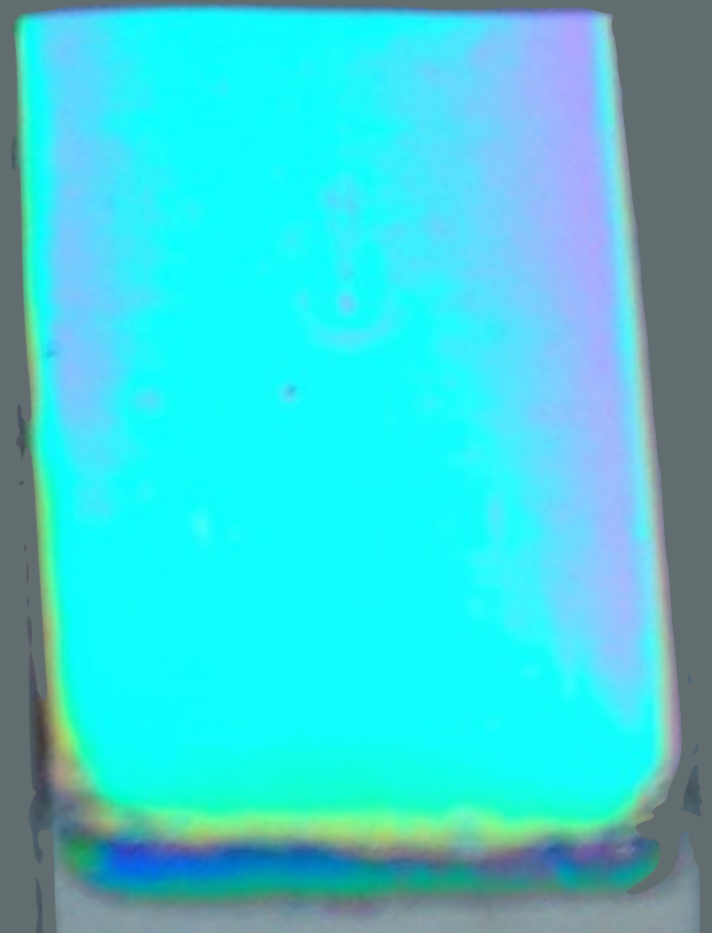
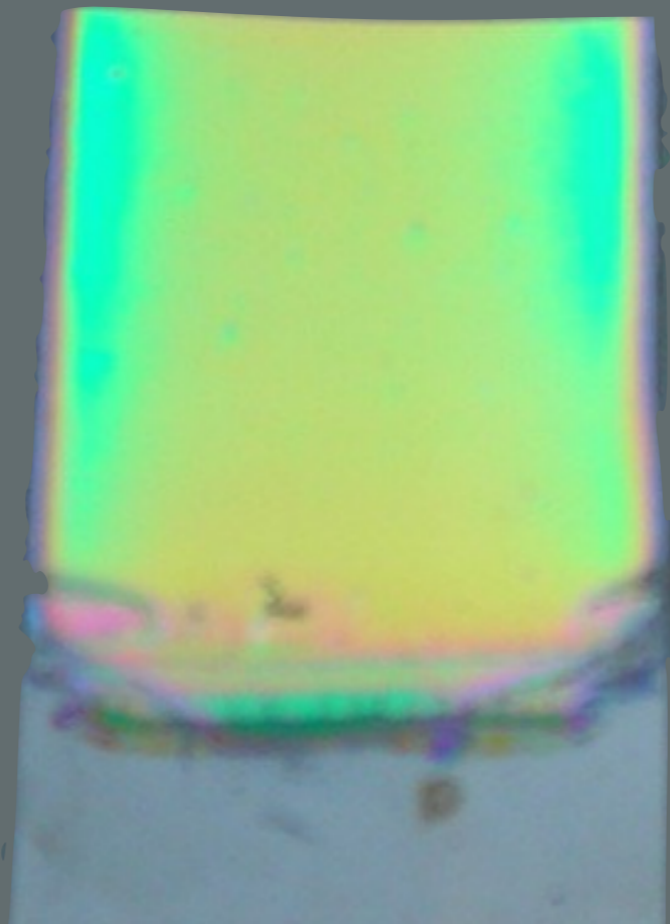
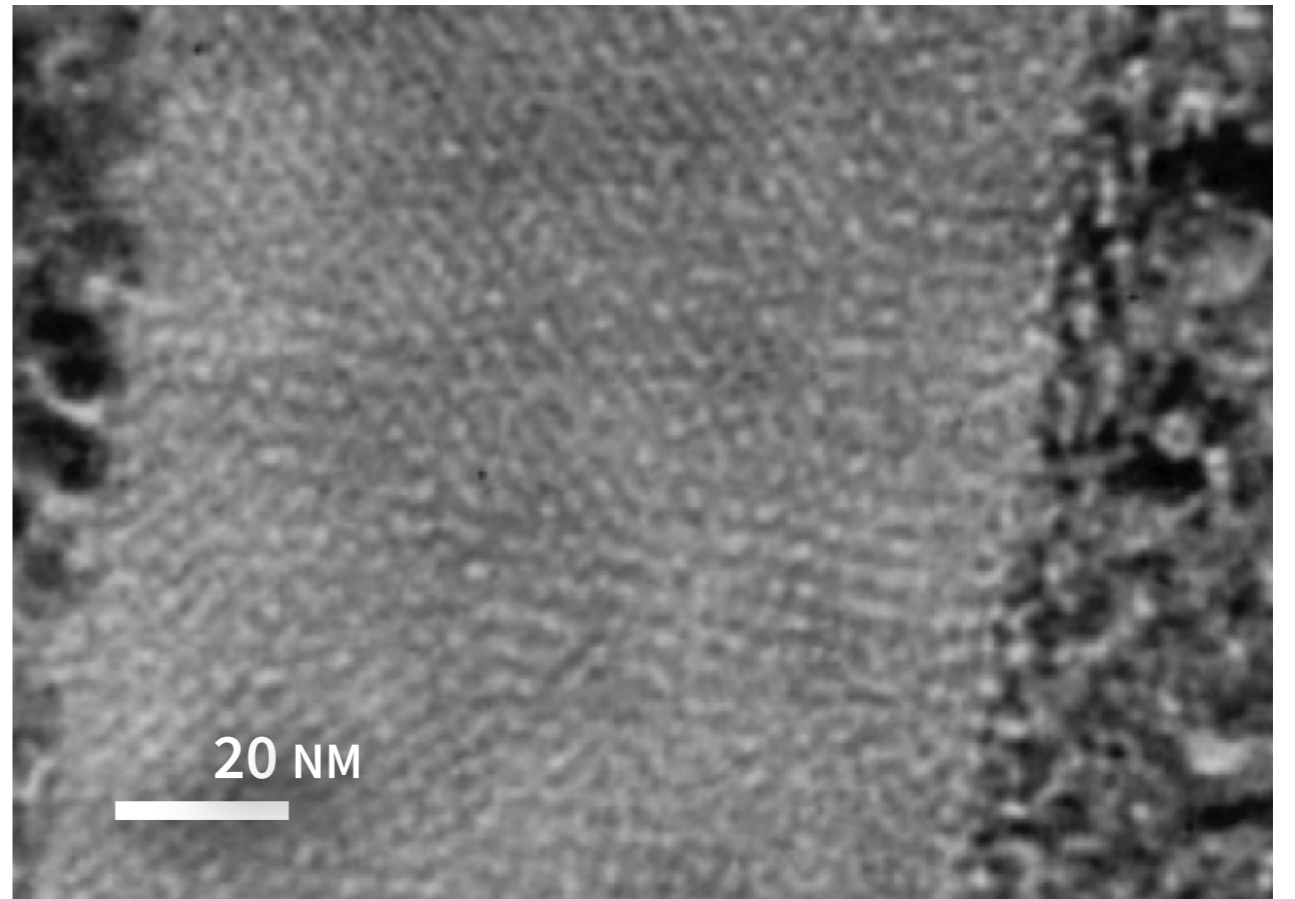
VICTORIA UNIVERSITY OF  
**WELLINGTON**  
TE HERENGA WAKA



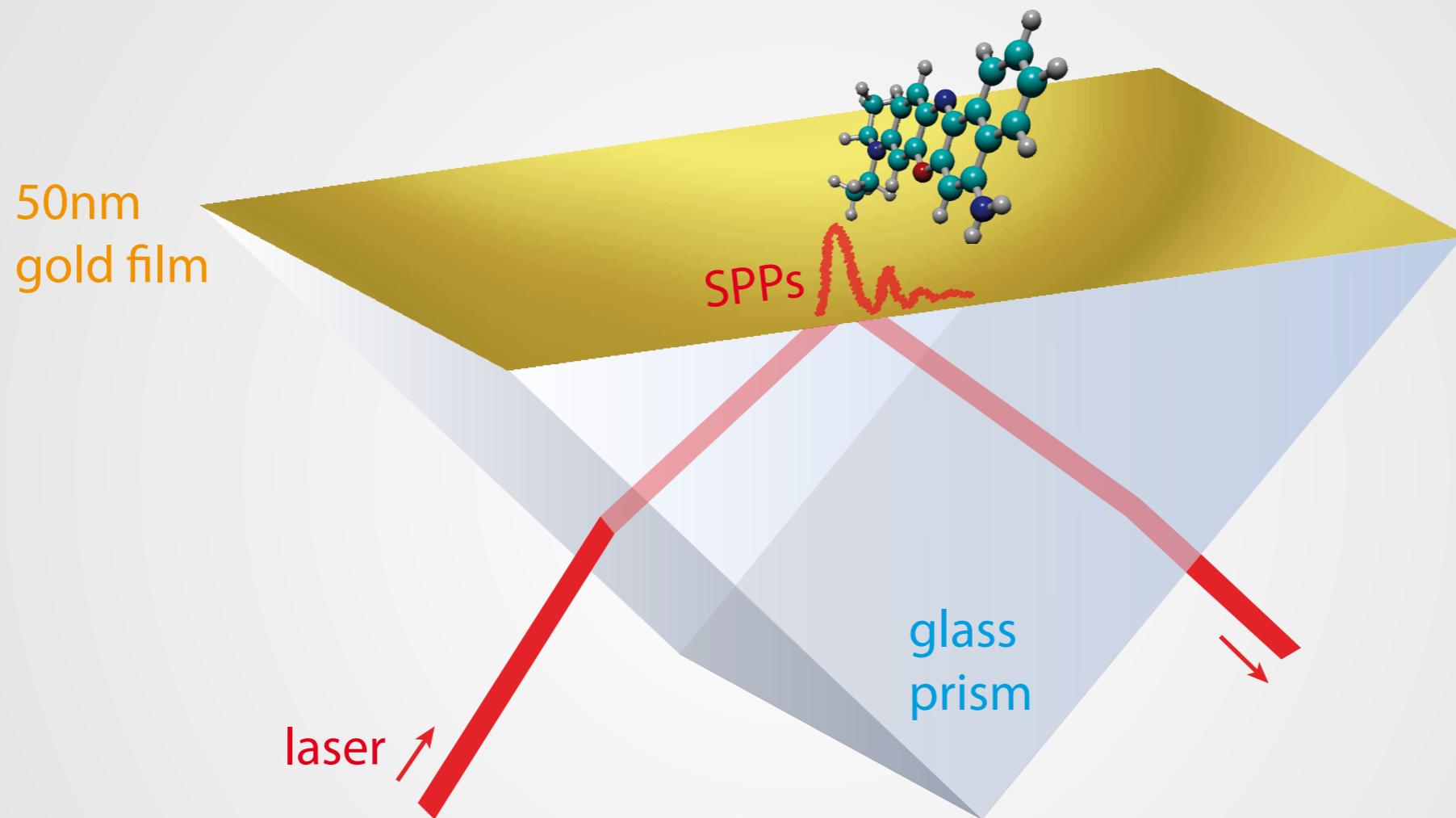
EXTRA INFORMATION



*Au* 23 nm  
*TiO<sub>2</sub>* 100 nm  
*SiO<sub>2</sub>* 82 nm  
*TiO<sub>2</sub>* 102 nm  
*SiO<sub>2</sub>* 79 nm  
*TiO<sub>2</sub>* 98 nm  
*SiO<sub>2</sub>* 82 nm  
*TiO<sub>2</sub>* 104 nm  
*SiO<sub>2</sub>* 72 nm  
*TiO<sub>2</sub>* 115 nm  
*glass*

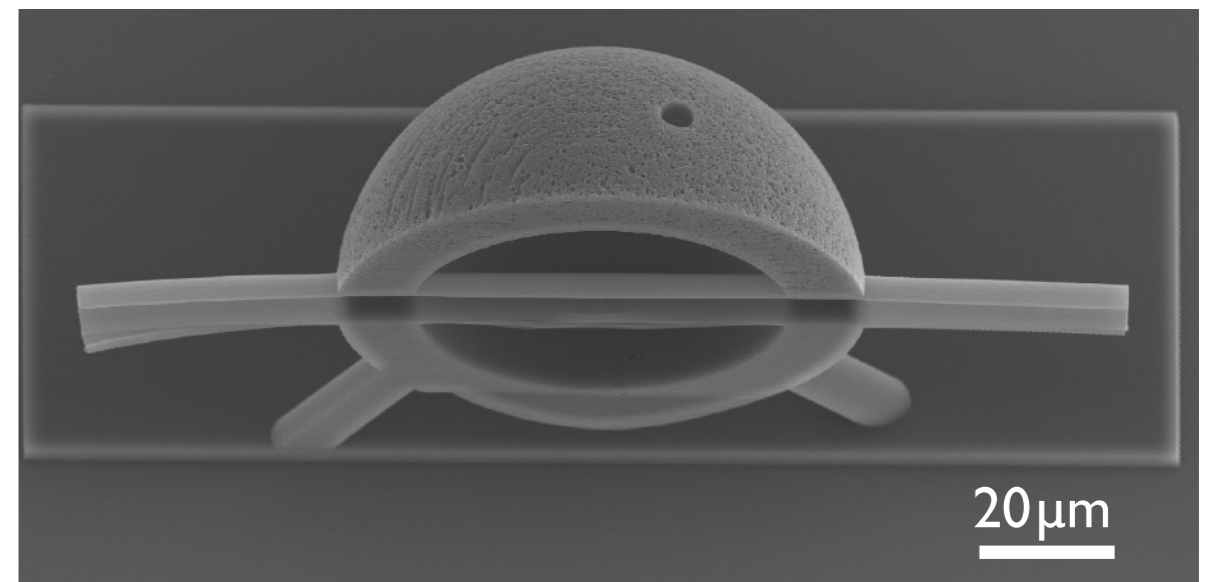
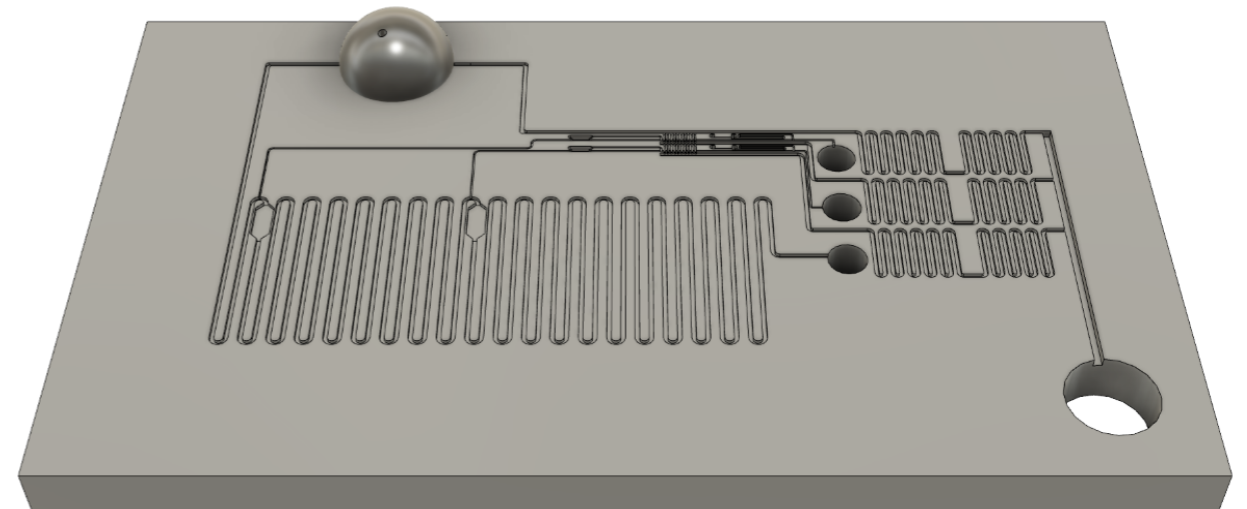
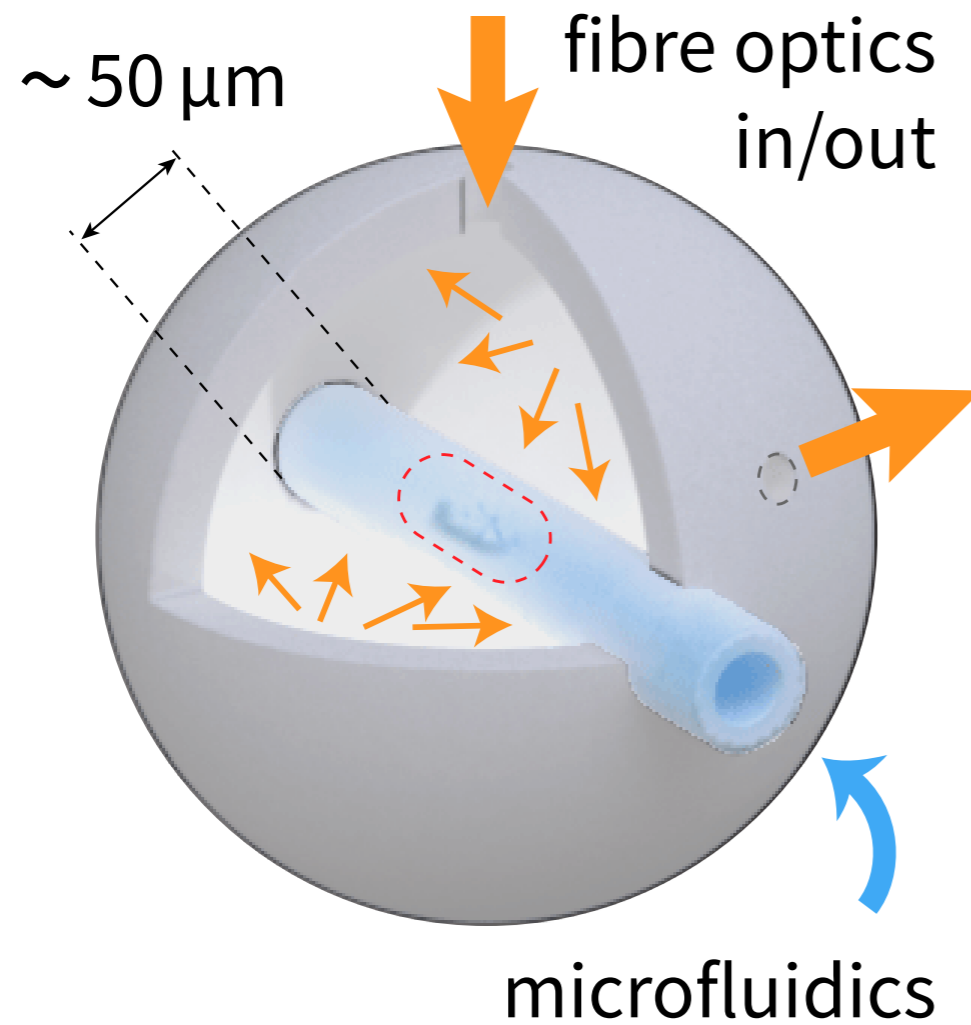






# SURFACE PLASMON RESONANCE SENSING PLATFORM

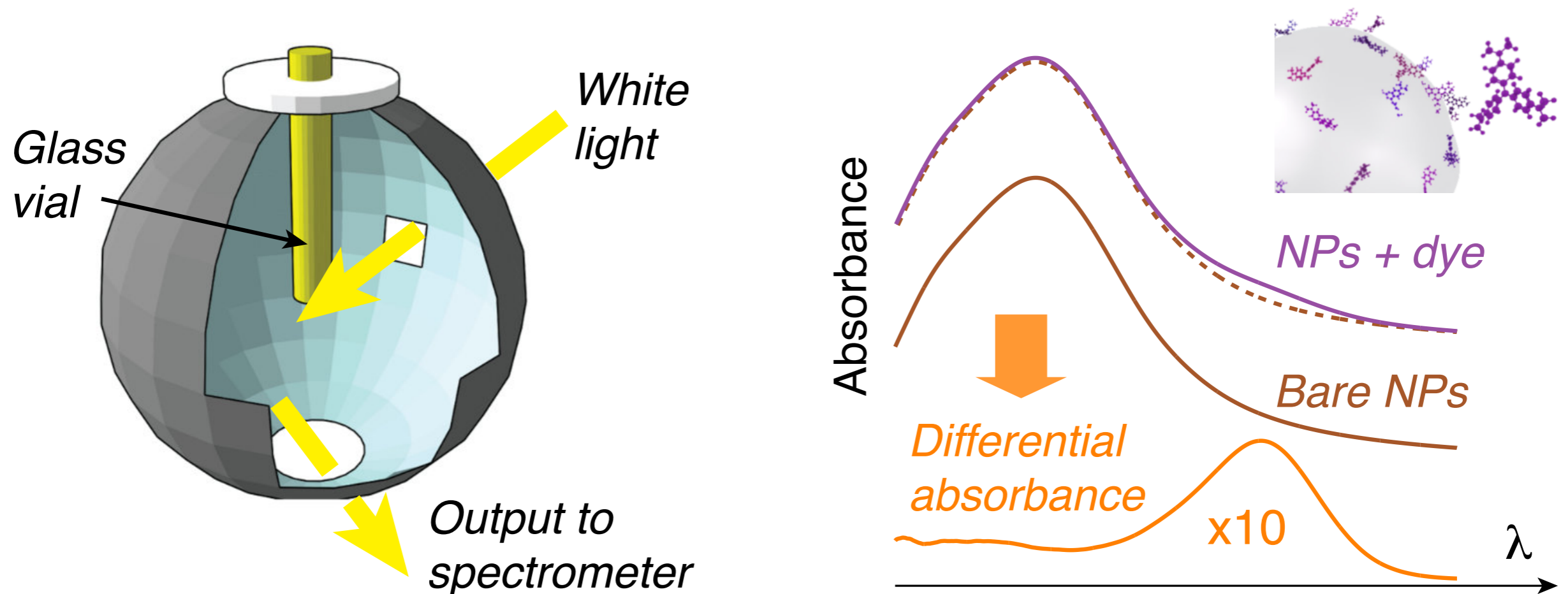
# UV-VIS OF MICRODROPLETS



*with Volker Nock (Canterbury)*



# UV–VIS SPECTROSCOPY OF TURBID SAMPLES



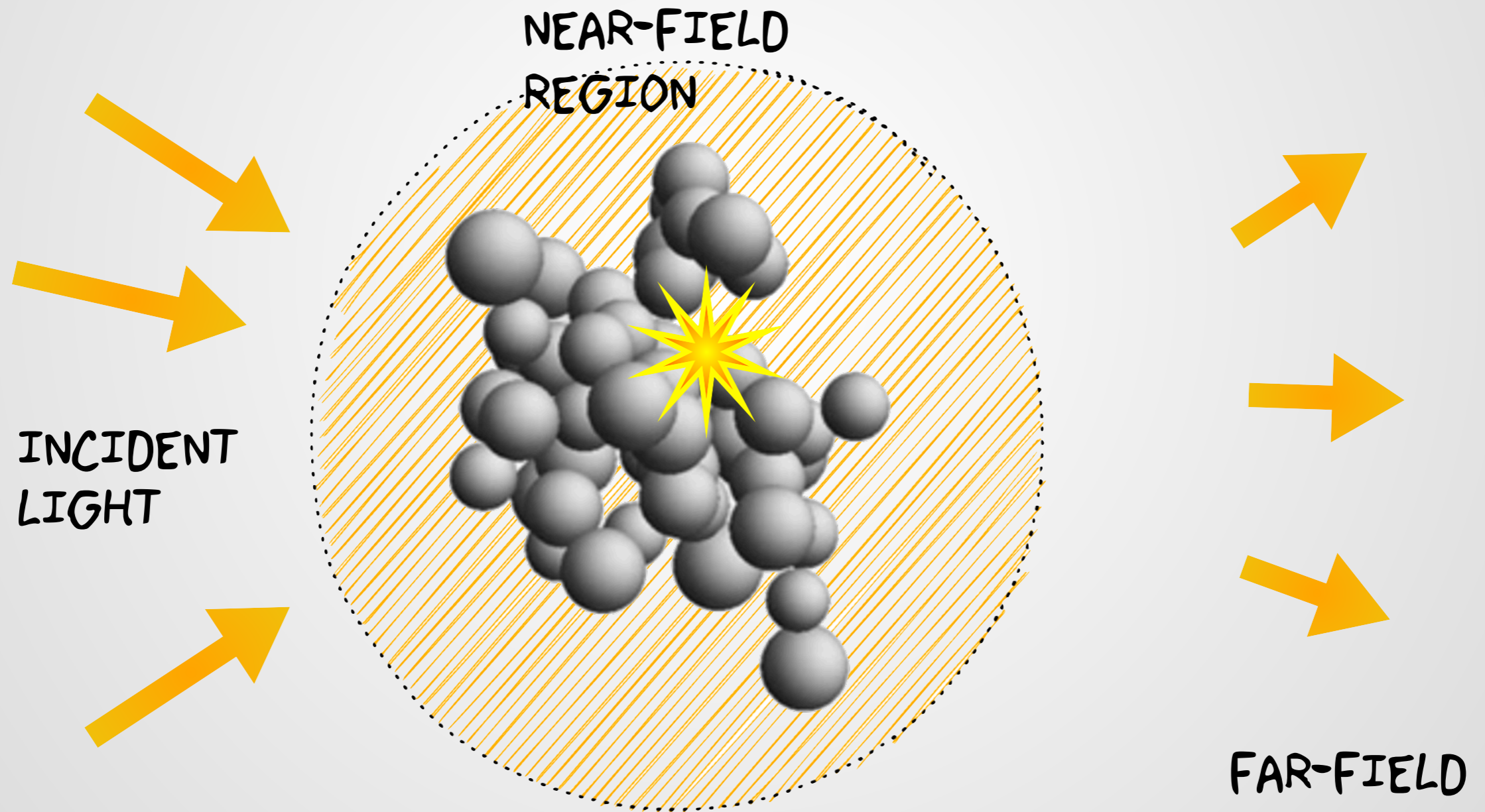
with Eric Le Ru (VUW)

Nature Photonics 10.1 (2016)

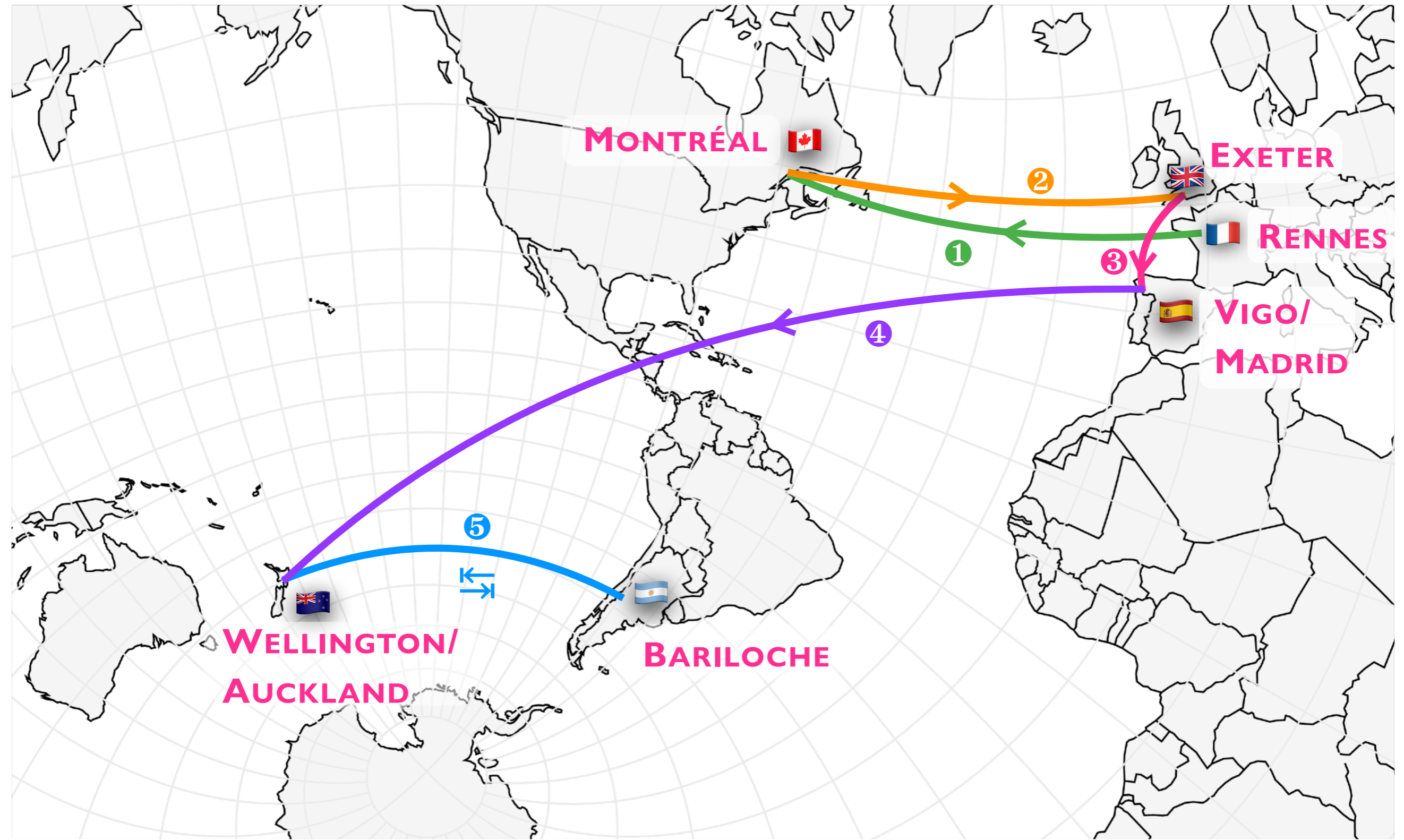
Nanoscale 11:12177–12187 (2019)

# LIGHT SCATTERING BY COLLECTIONS OF PARTICLES

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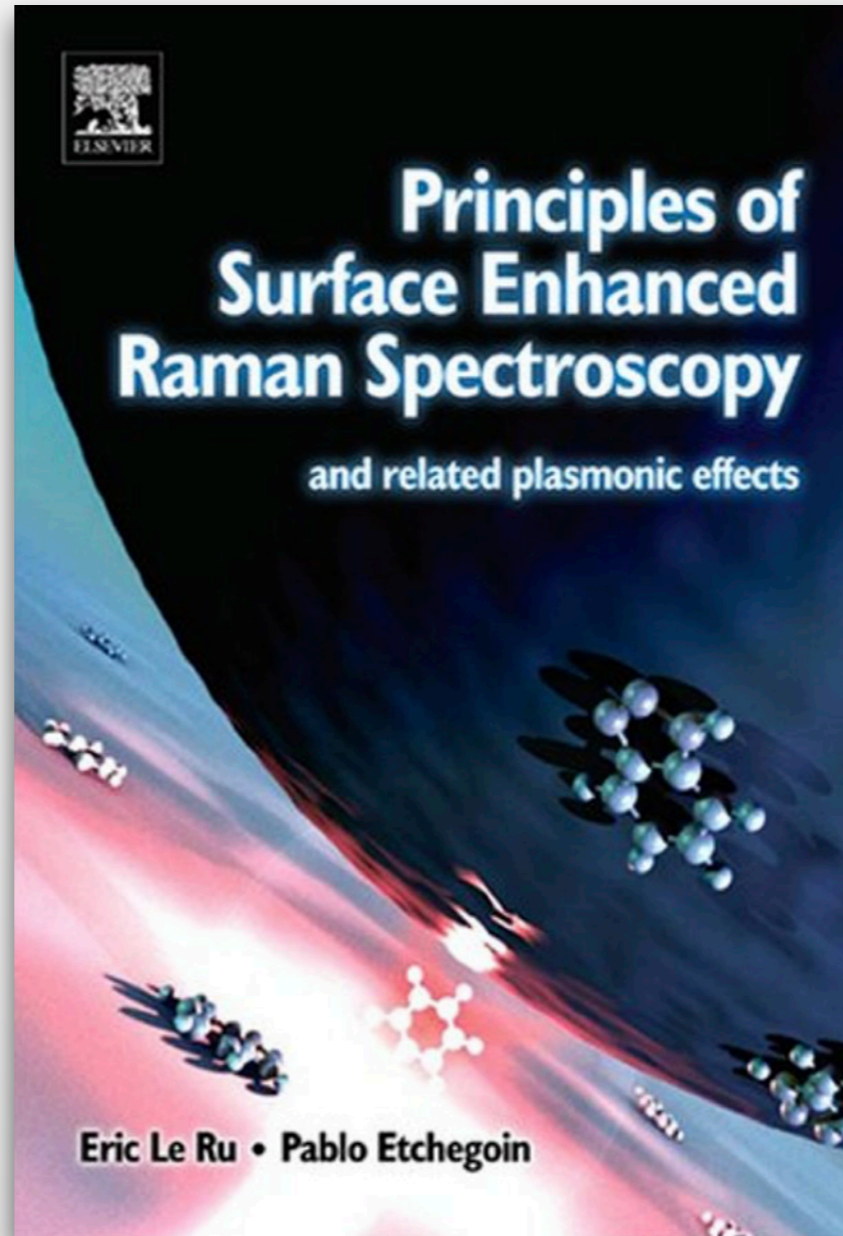






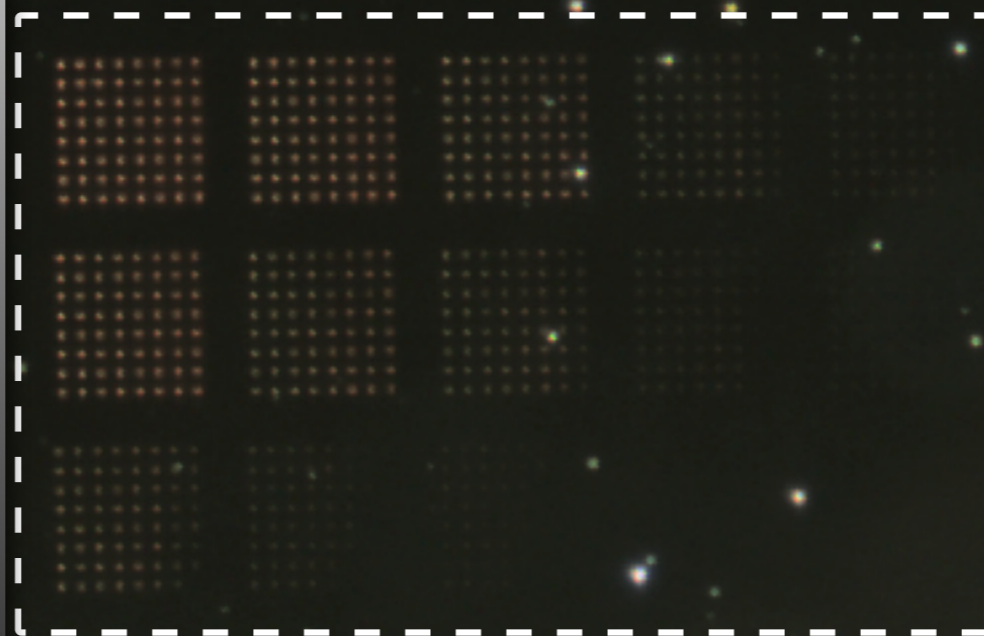
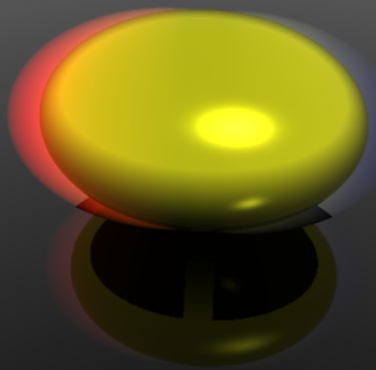
# RAMAN LAB (VUW) – PABLO ETCHEGOIN, ERIC LE RU

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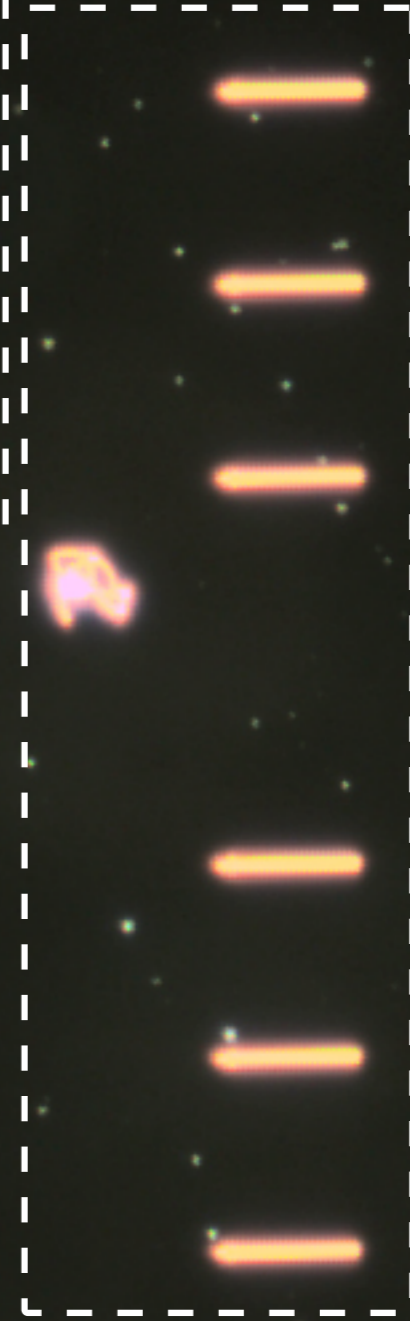




# NANO ANTENNAS FOR LIGHT



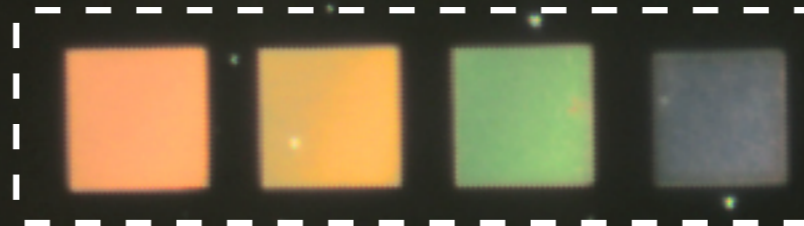
*single particles*



*marks*

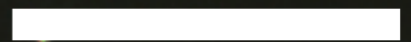
*flake*

*dust*



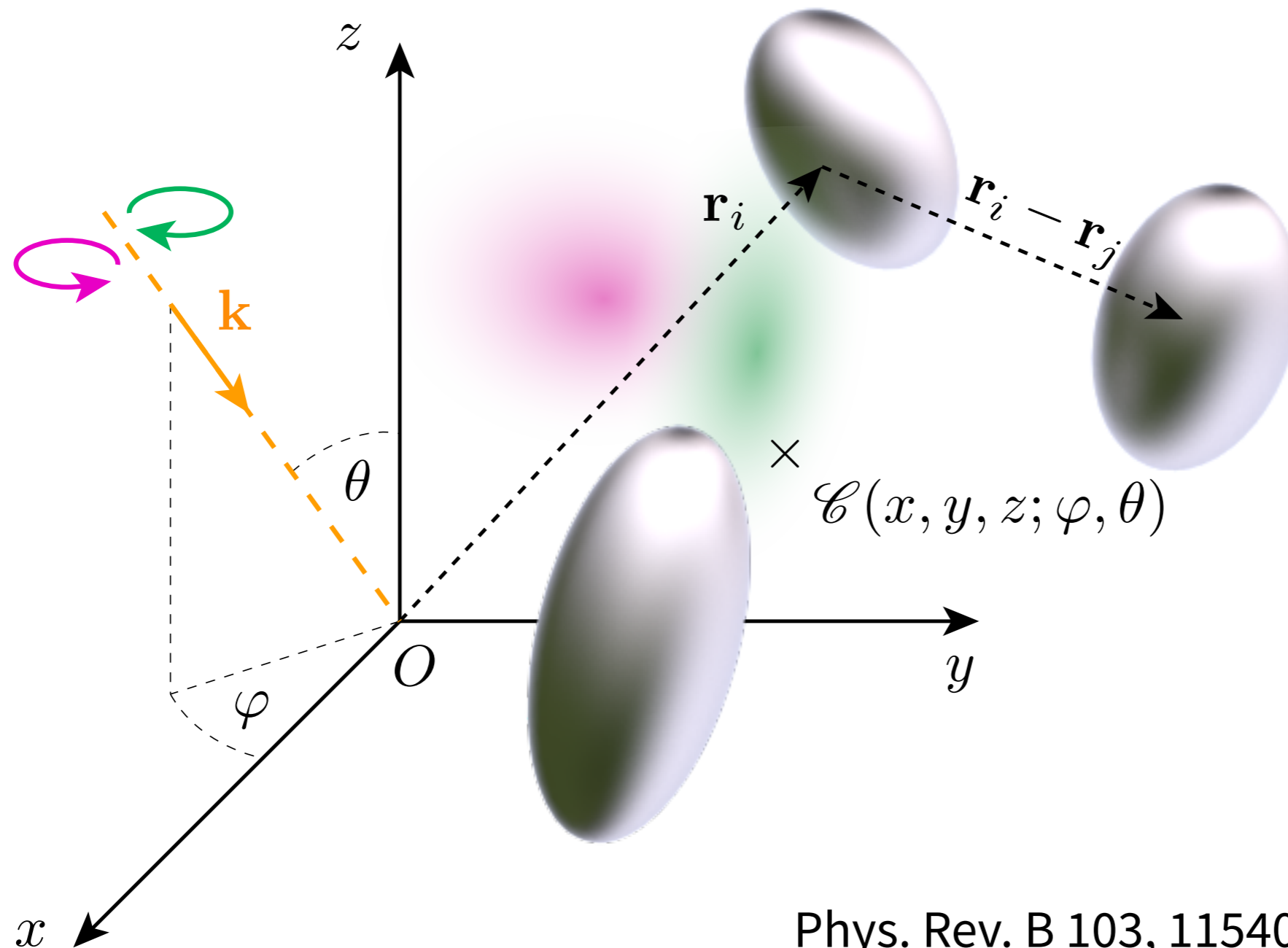
*diffractive arrays*

100 $\mu$ m



# LOCAL DEGREE OF OPTICAL CHIRALITY $\mathcal{C} \propto \Im(\mathbf{E}^* \cdot \mathbf{B})$

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Phys. Rev. B 103, 115405 (2021)

J. Quant. Spectrosc. Radiat. Transf. (2022)