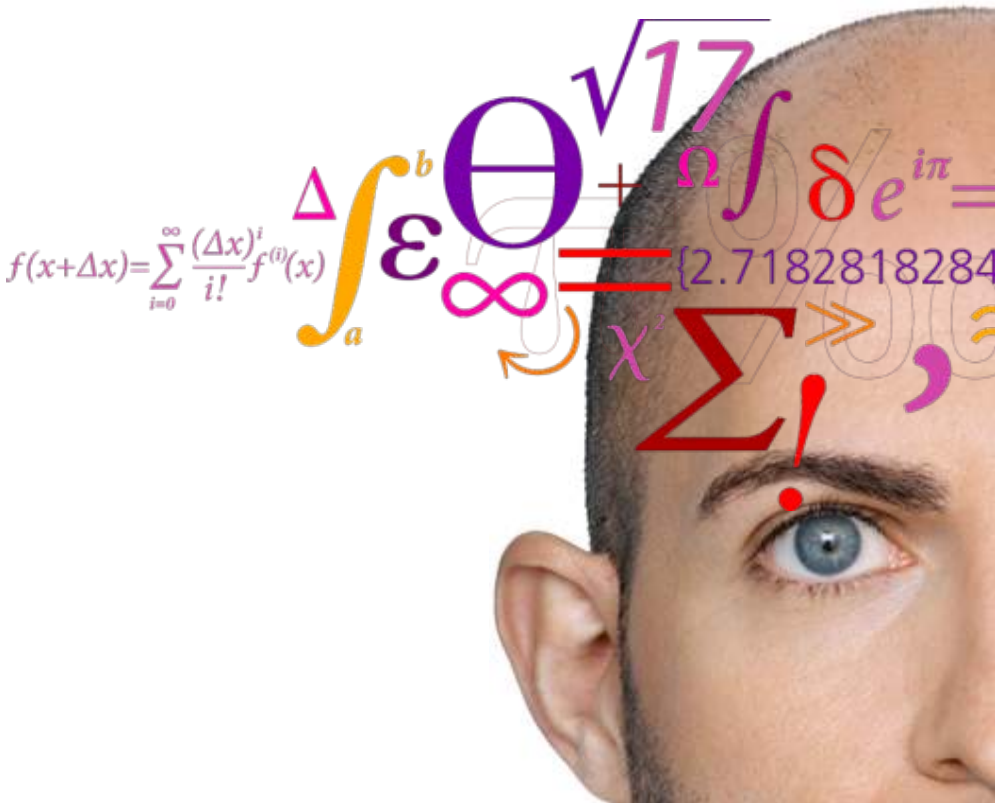
DTU Nanotech
Department of Micro- and Nanotechnology

Detection of small organics in water

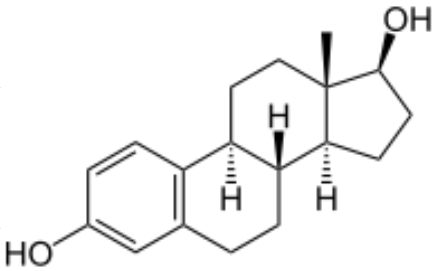
- the MUSE project

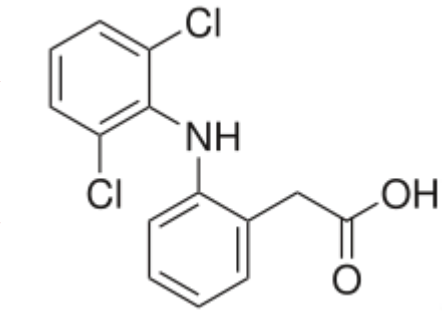
Kasper Bayer Frøhling
PhD student
DTU Nanotech



Motivation – water quality

17β-estradiol (E2)





Diclofenac

Source: http://europa.eu/rapid/press-release_IP-12-88_en.htm

MUSE

Multi sensor DVD platform

The Danish Council for Strategic Research

17.4 MDKK

GRUNDFOS

Unisensor

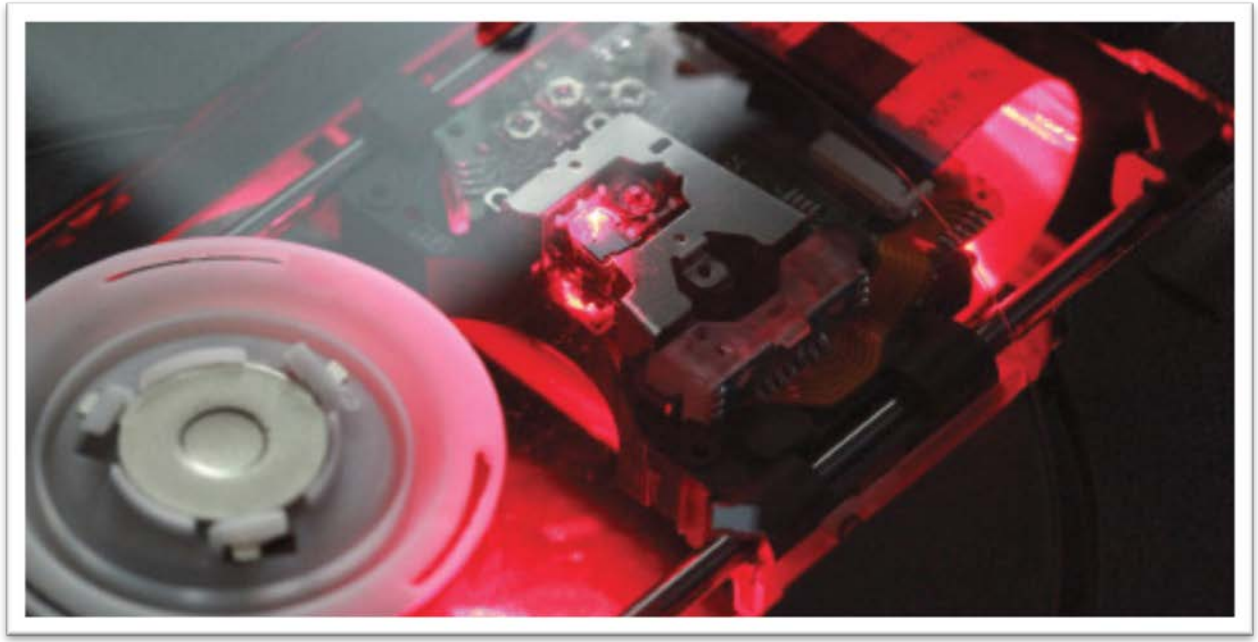
viroGates

The DVD/Blu-ray setup

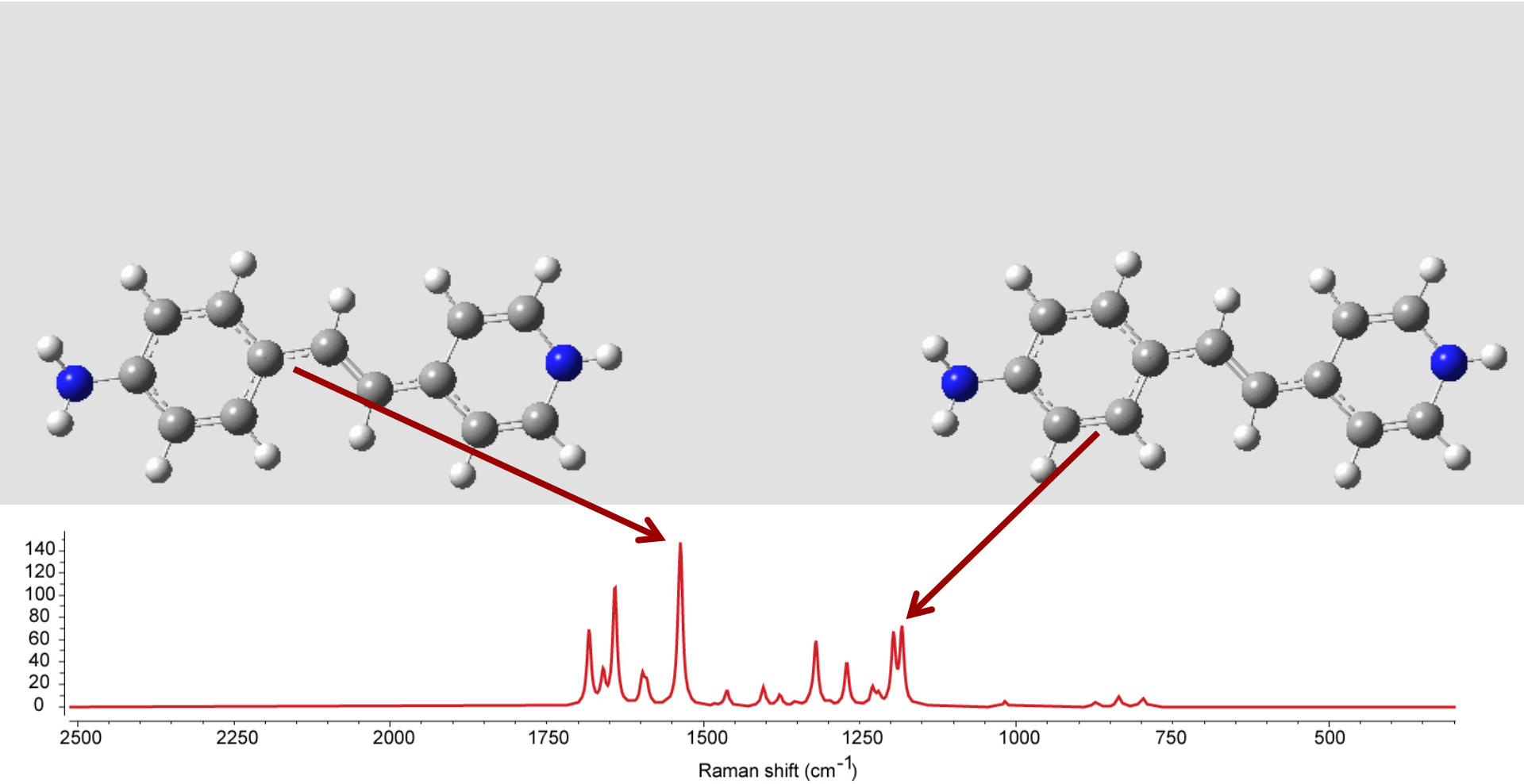
Platform

Sampling

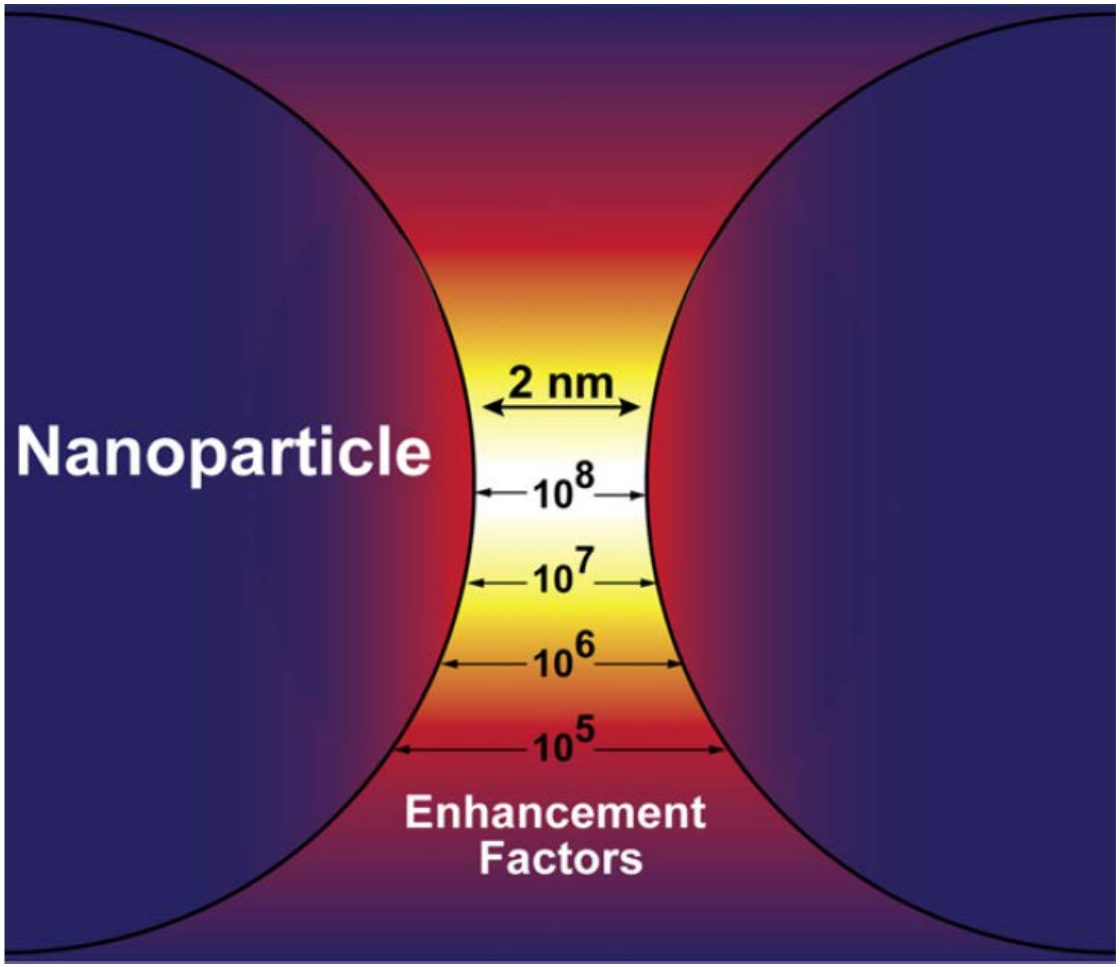
Sensing



Raman Spectroscopy

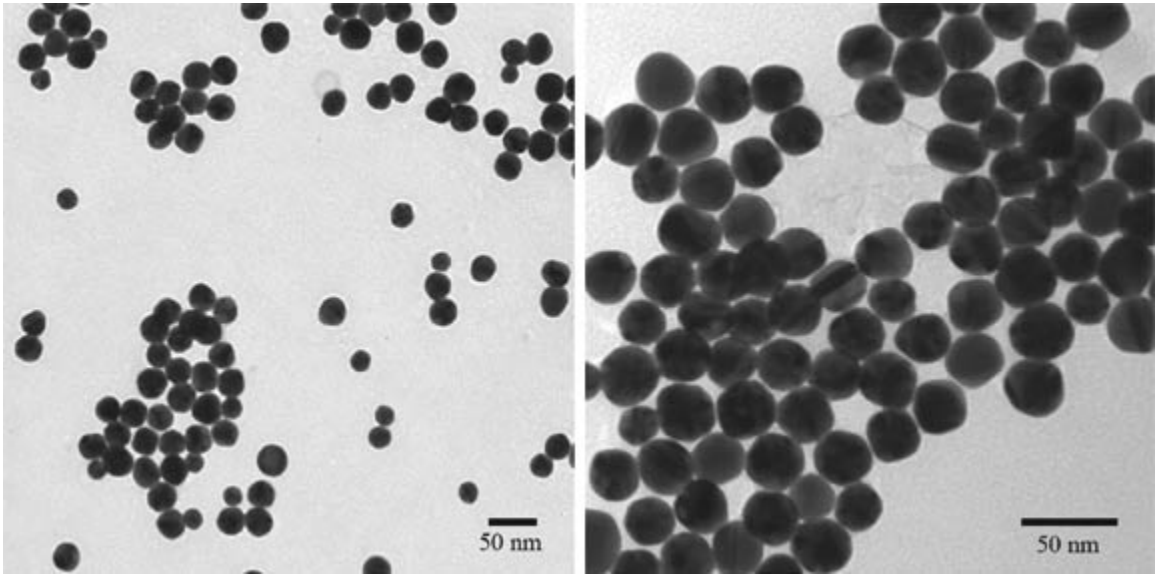


Hotspot explanation

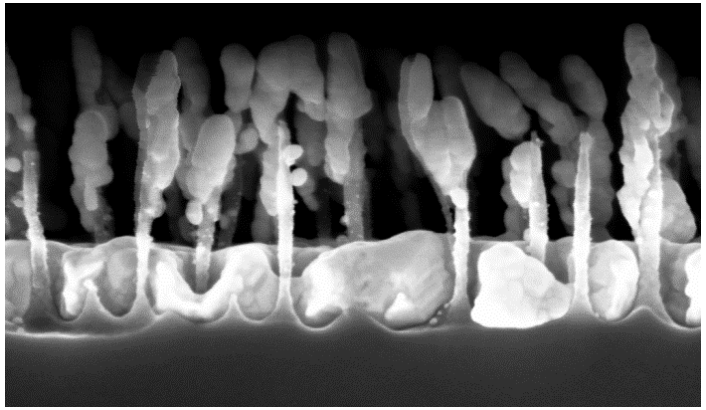


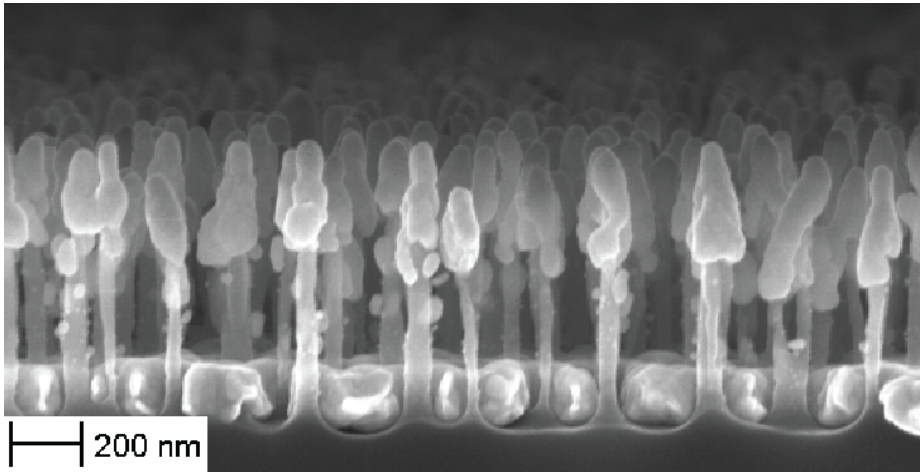
Surface-Enhanced Raman Spectroscopy (SERS)

Nanoparticles

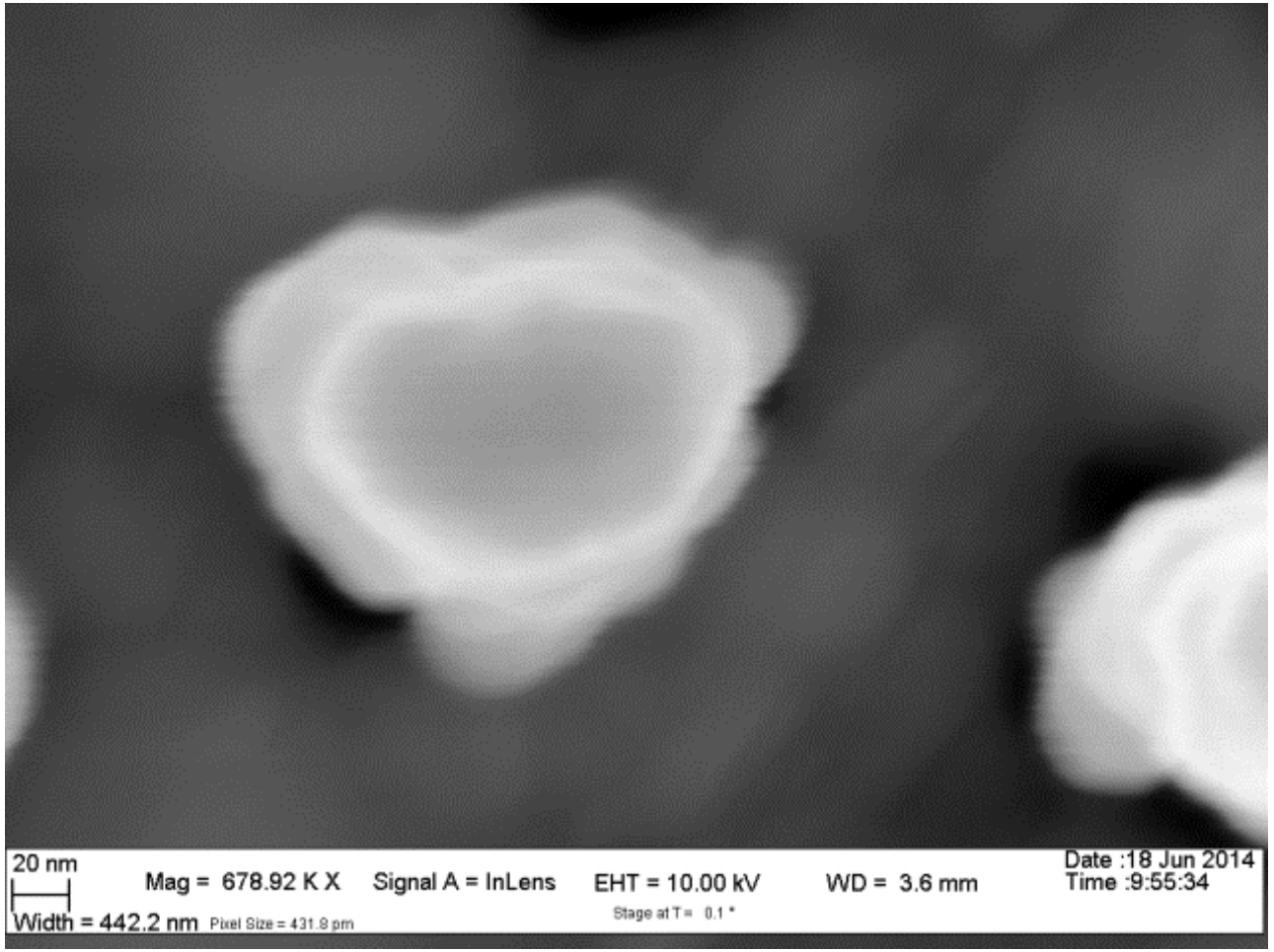


Our SERS Substrate



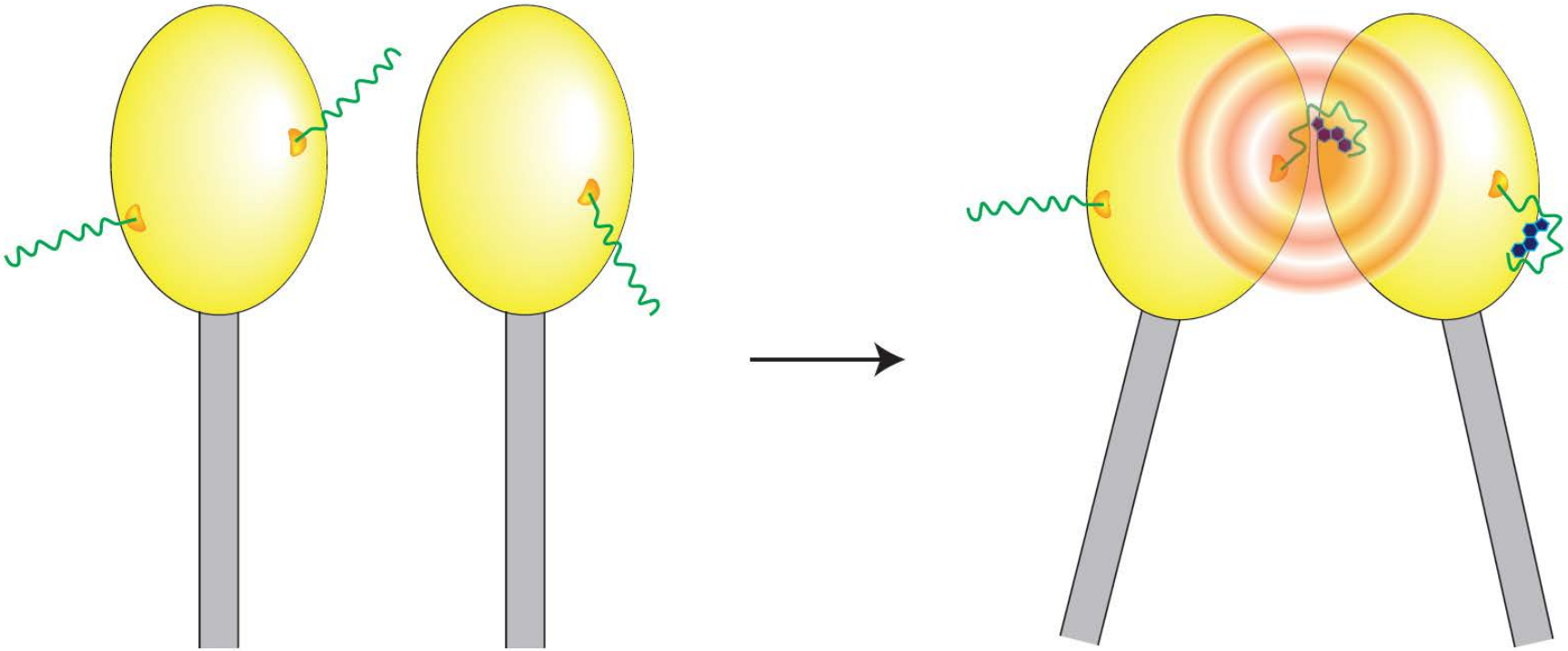


Our SERS Substrate

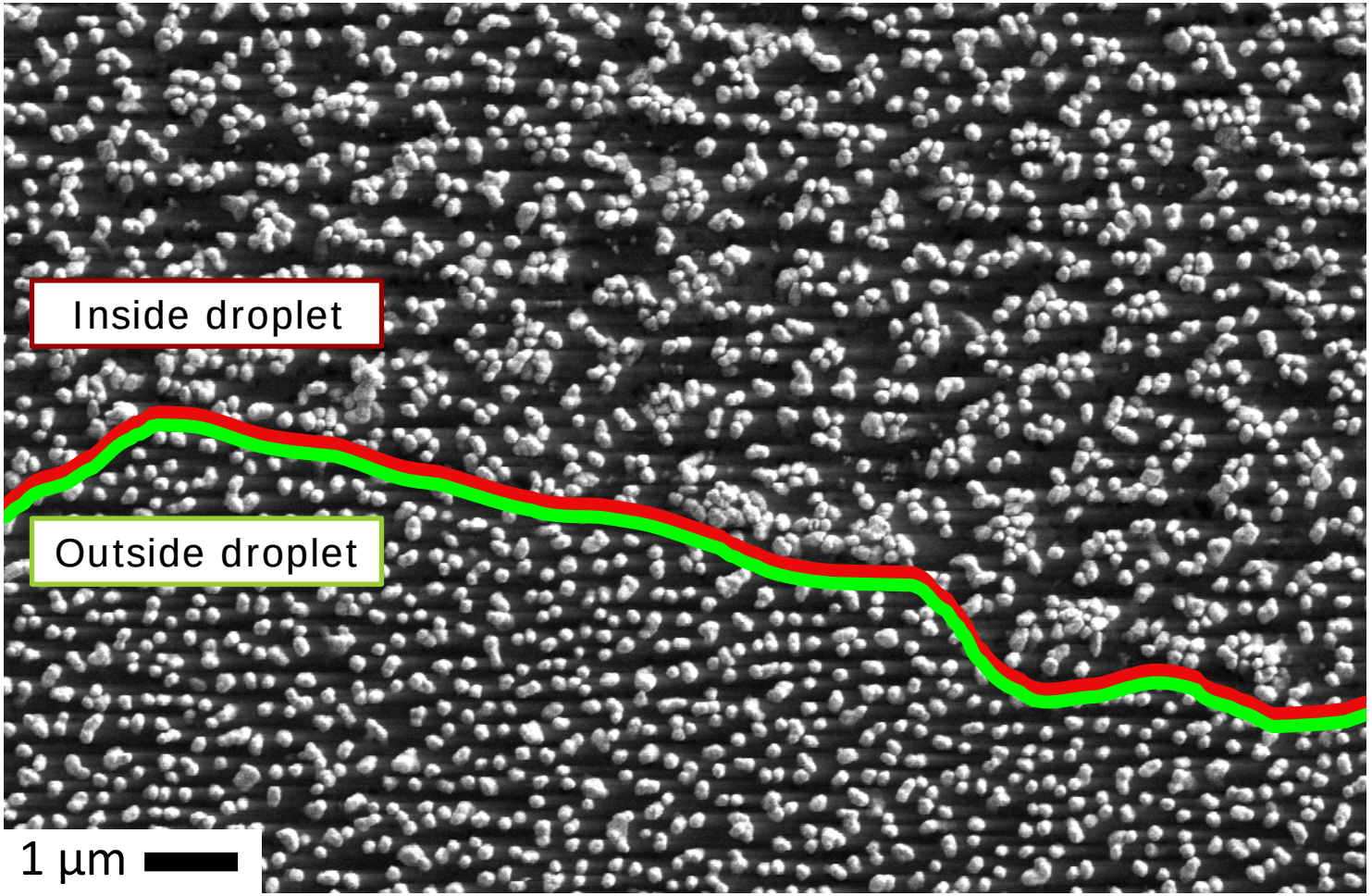


 Method by: Schmidt et al. Adv Mater. 2012 Mar 8;24(10):OP11-8.

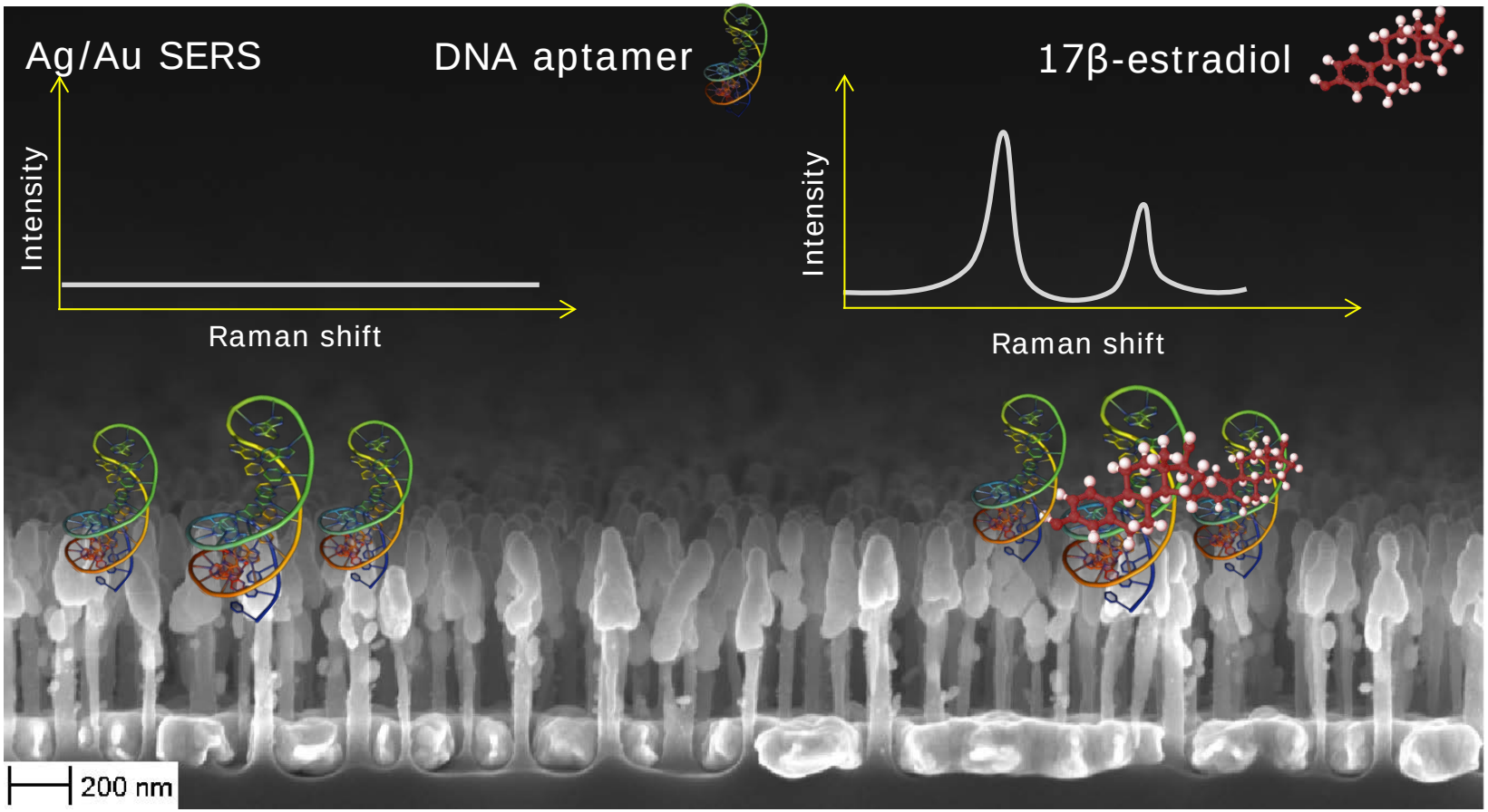
SERS Detection



SERS Detection

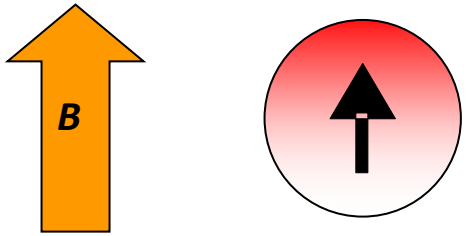


Capturing the Target

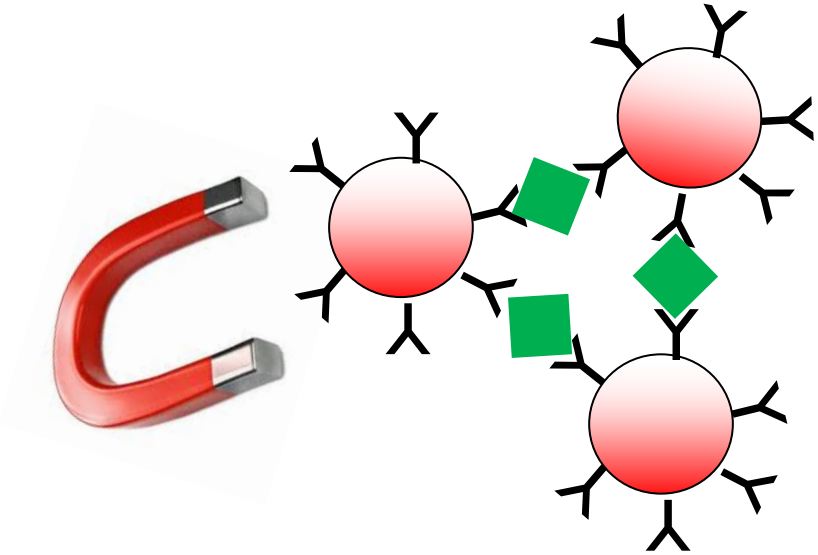


Magnetic Nanoparticles

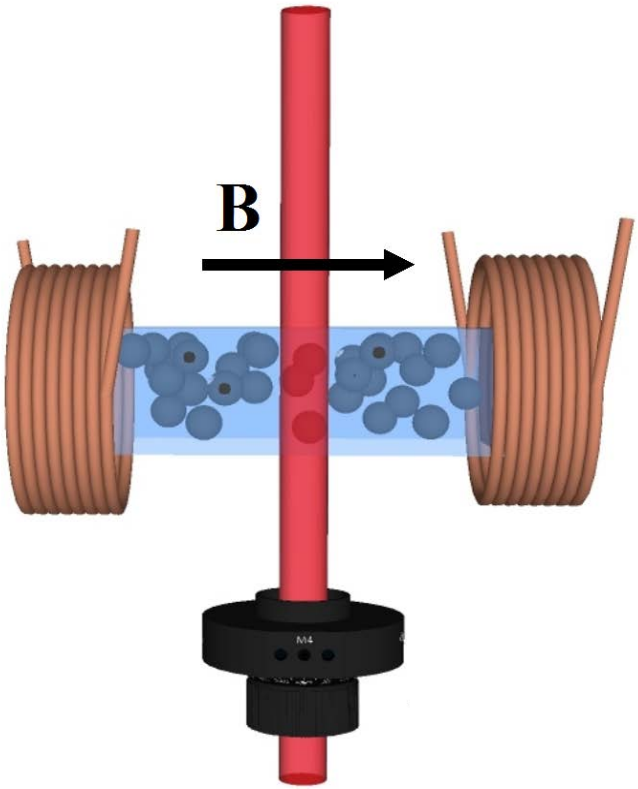
Brownian relaxation = physical rotation of the particle



Magnetic Nanoparticles



Magnetic Nanoparticles



Work
in
progress