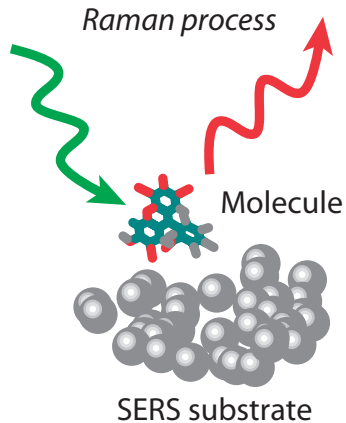
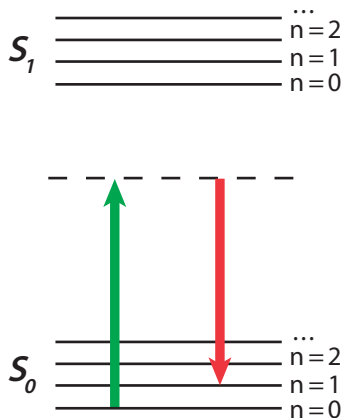


SERS microscopy in the Kretschmann configuration

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*School of Chemical and Physical Sciences
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Surface-Enhanced Raman Scattering

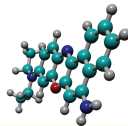
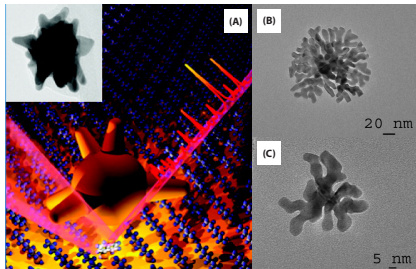


$$\text{Enhancement} \propto |E(\omega_L)|^2 |E(\omega_R)|^2$$

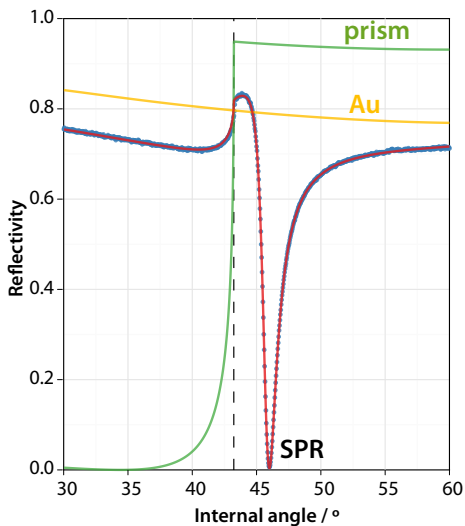
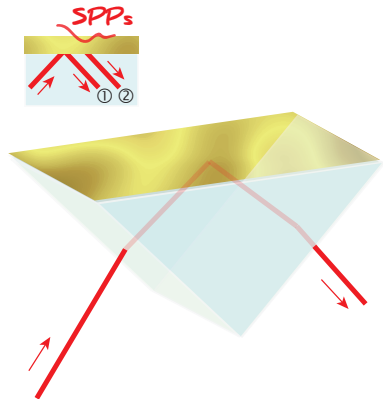
typically $\sim 10^4 - 10^9$

A shift in paradigm
for SERS substrates:

Revisiting flat
metallic films

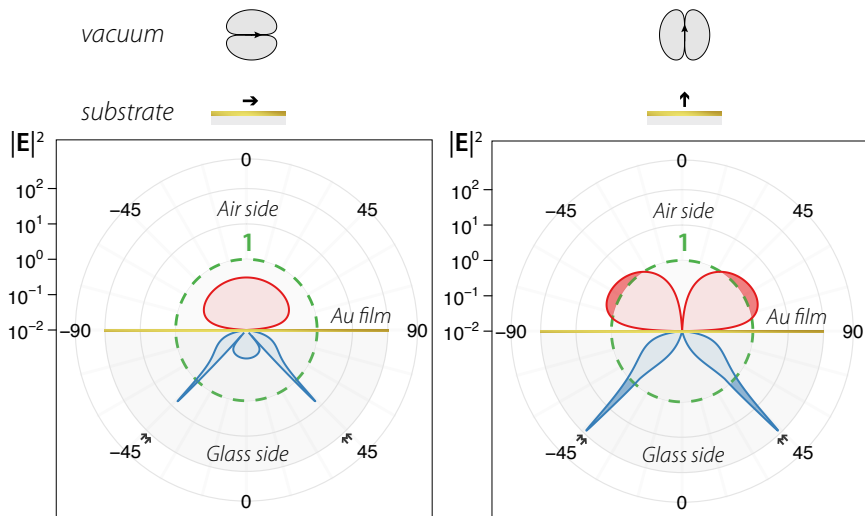


Surface Plasmon-Polaritons

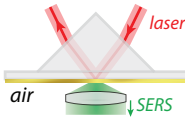
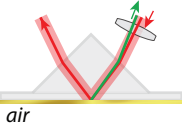
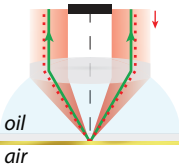
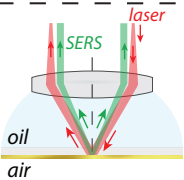


Dipole Radiation in the Kretschmann Configuration

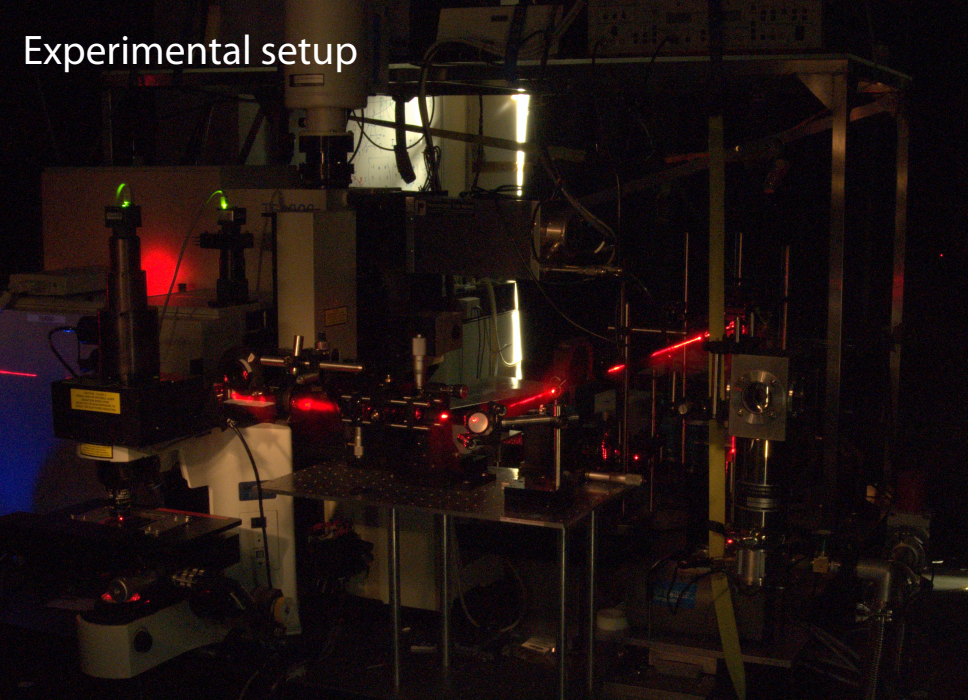
Radial Pattern of Excitation & Emission (*reciprocity*)



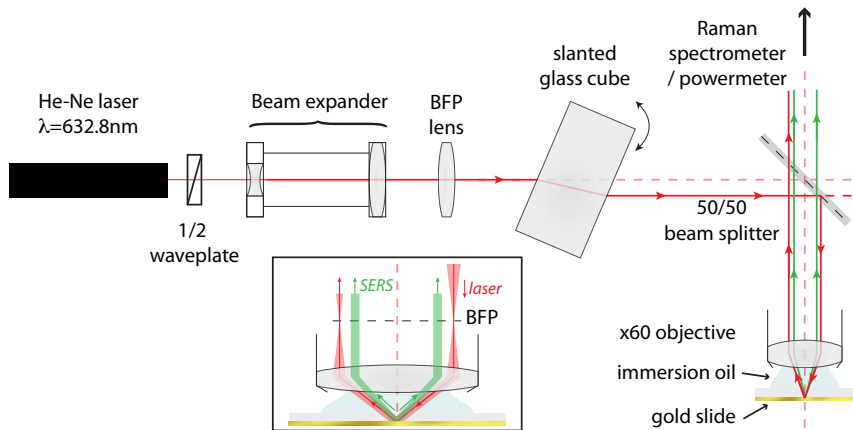
Combining SPR and SERS

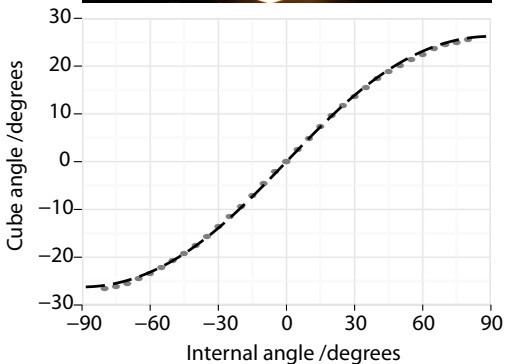
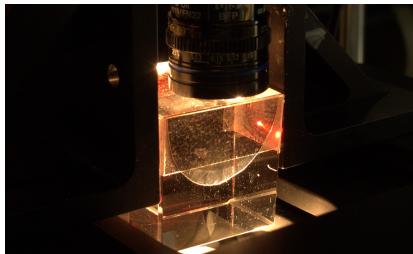
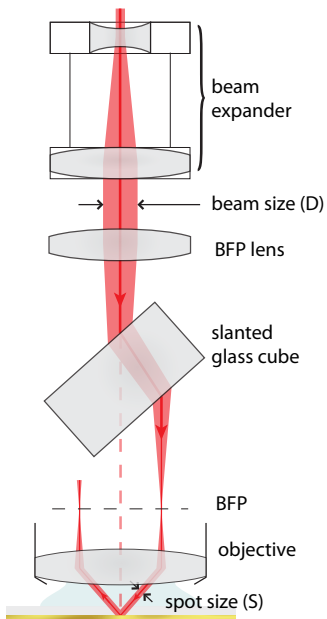
				
	Y. Liu <i>et al</i> <i>Rev. Sci. Instrum.</i> 81 , 036105 (2010)	S. A. Meyer <i>et al</i> <i>Anal. Chem.</i> 83 , 2337 (2011)	F. D. Stefani, <i>et al</i> <i>Phys. Rev. Lett.</i> 94 , 023005 (2005)	S. A. Meyer <i>et al</i> <i>J. Phys. Chem. A</i> 116 , 1000–1007 (2012)
SPR	✓	✓	✗	✓
coupling	✓	✓	✗	✓
microscopy	≈	✗	✓	✓
SERS signal	≈	≈	≈	✓

Experimental setup

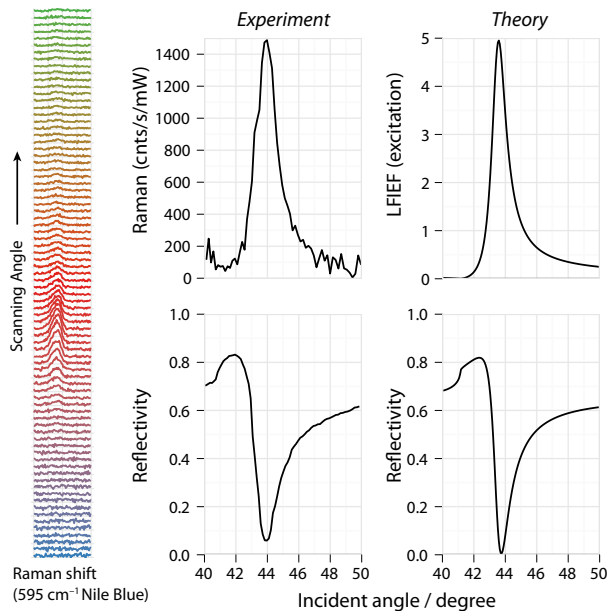


Experimental setup

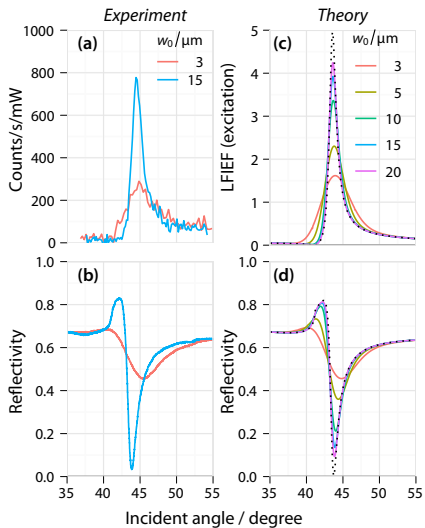




Simultaneous SERS and SPR

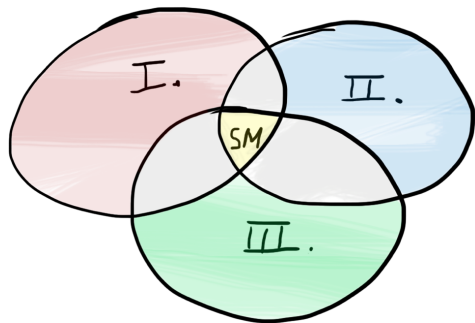


Beam divergence, *étendue*



Colour-by-numbers Game

Single-Molecule SERS with Uniform Enhancement?



- I. Substrate
Ag, LRSPs
- II. Dye
⊥ orientation, density
- III. Excitation & collection
SERS, spot size

Best-case scenario

**Single-Molecule
requires $\sim 10^3$**