

# Raman Microscopy with Two Counter-Propagating Beams

Alejandro Diaz Tormo, D Khalenkow, A Skirtach and N Le Thomas

Alejandro.DiazTormo@UGent.be

## Motivation

Fluorescence microscopy suffers from:

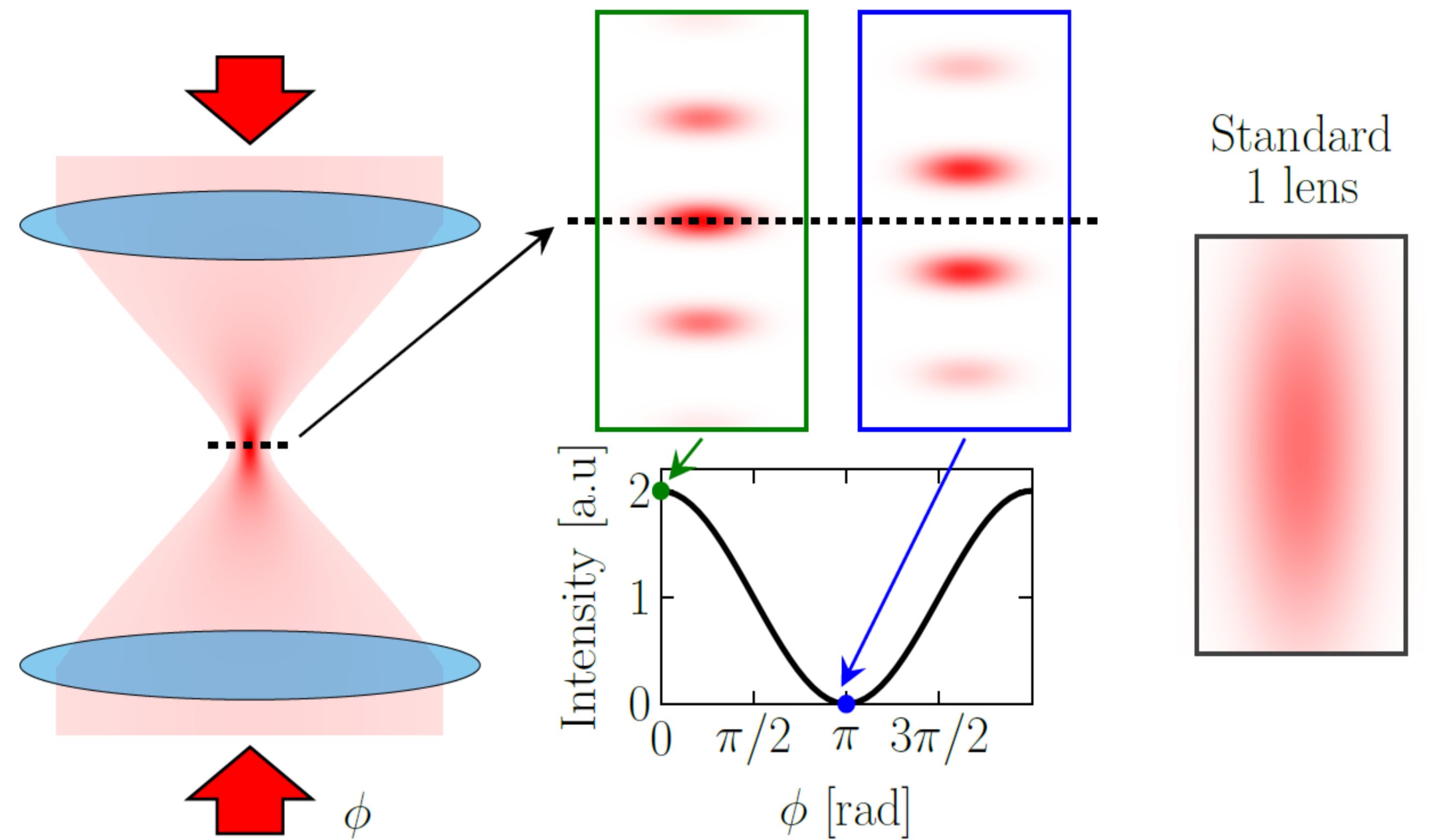
- Photobleaching
- Extrinsic fluorophores can affect the specimen

Using the intrinsic Raman signal solves these issues, but is weak and has low resolution.

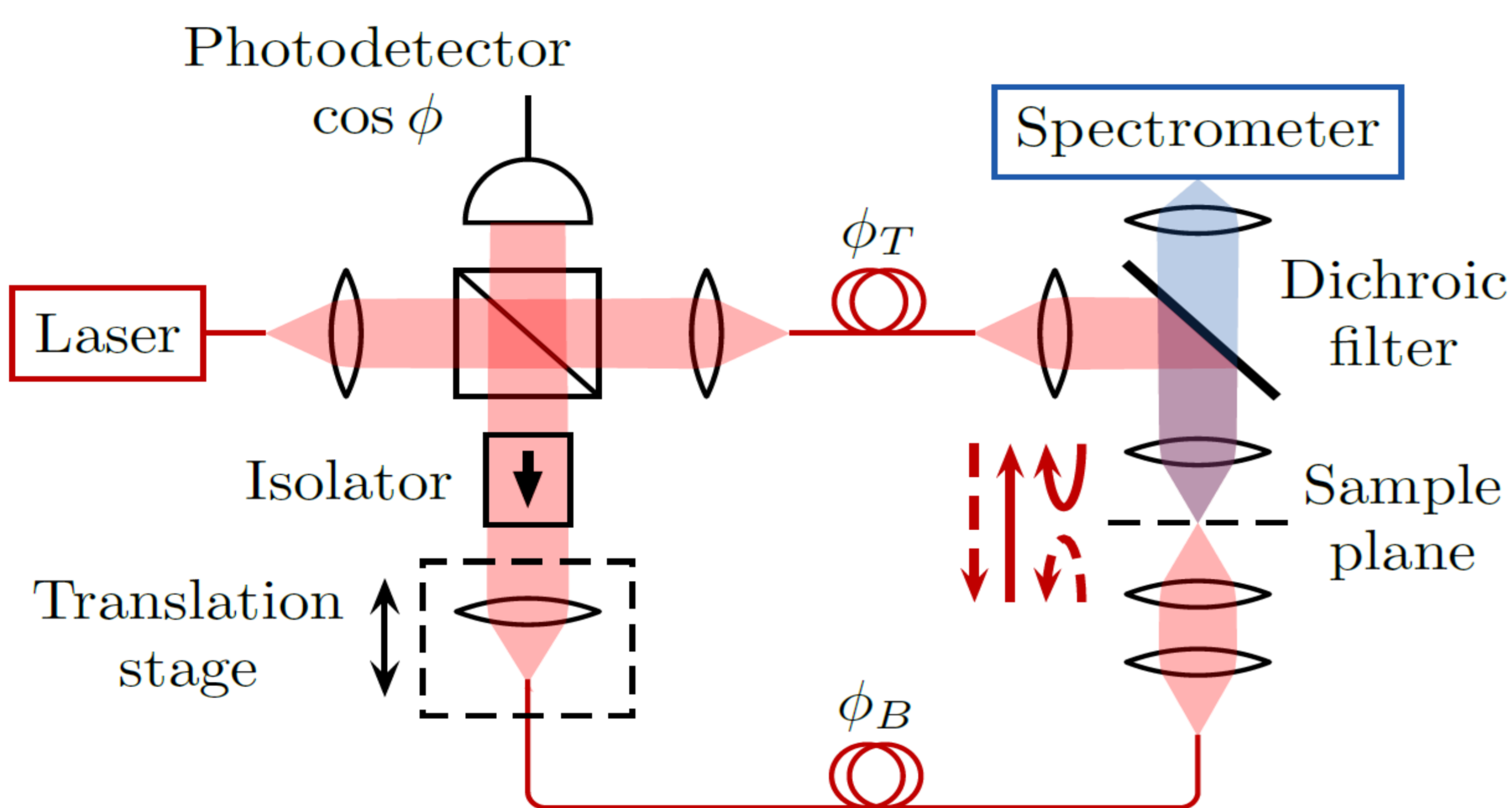
Novel Raman microscopy technique: Two counter-propagating pump beams generate an interference pattern that focuses the light into a smaller volume.

Compared to standard Raman microscopy we get:

- Better spatial resolution
- Larger Raman signal

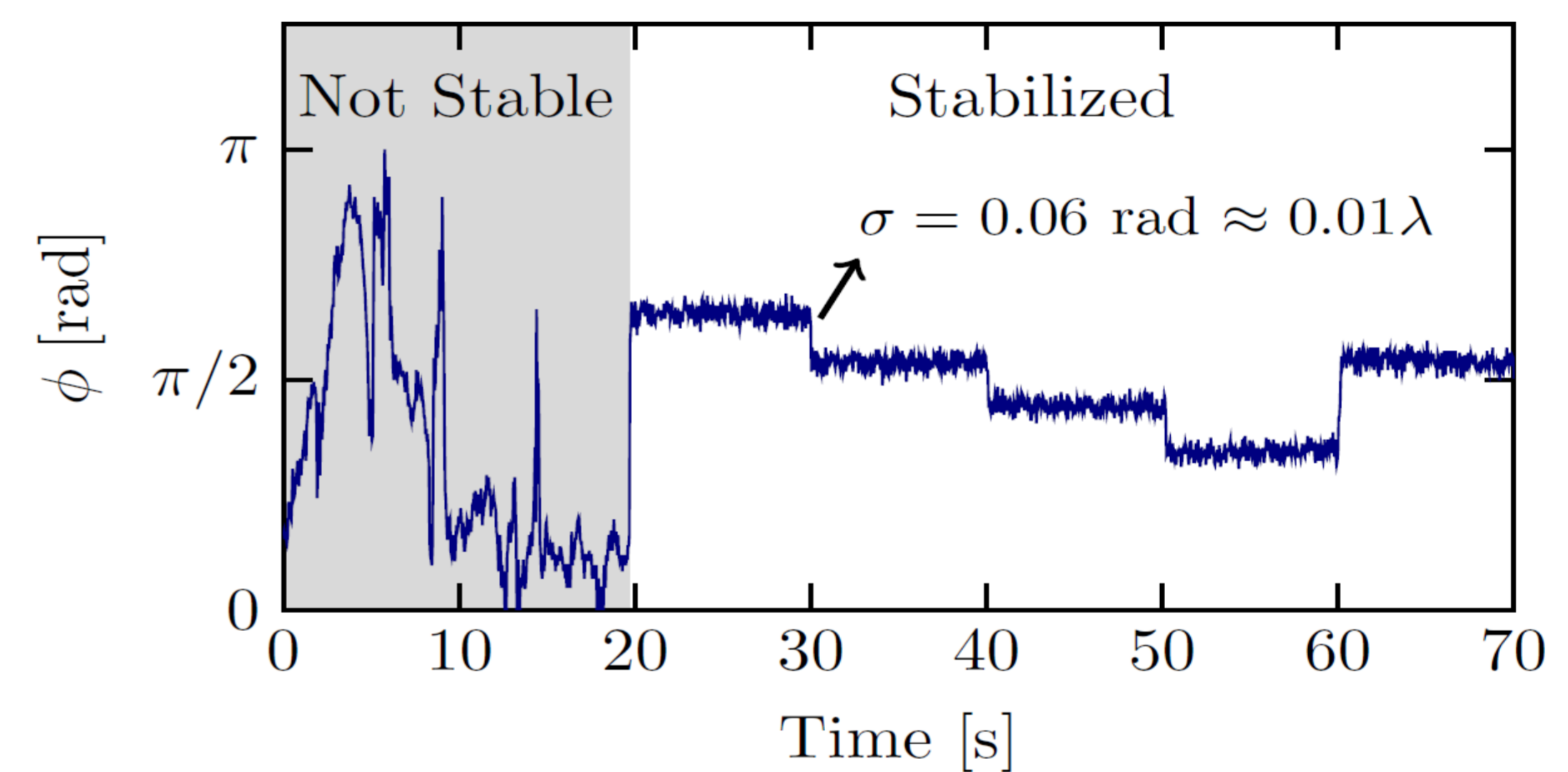


## Experimental Setup



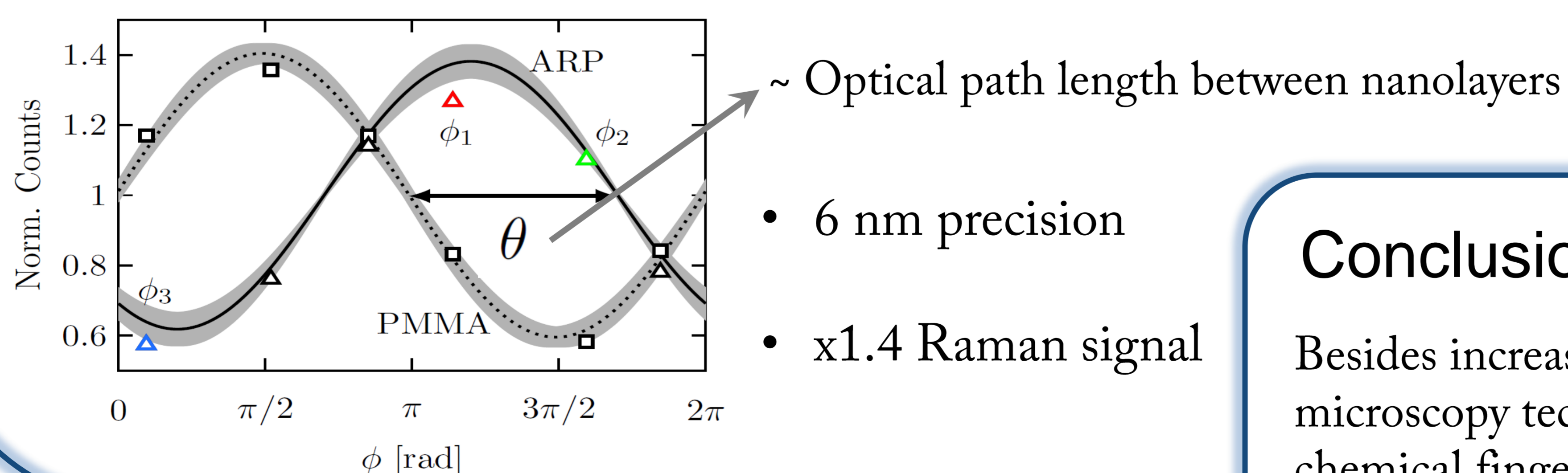
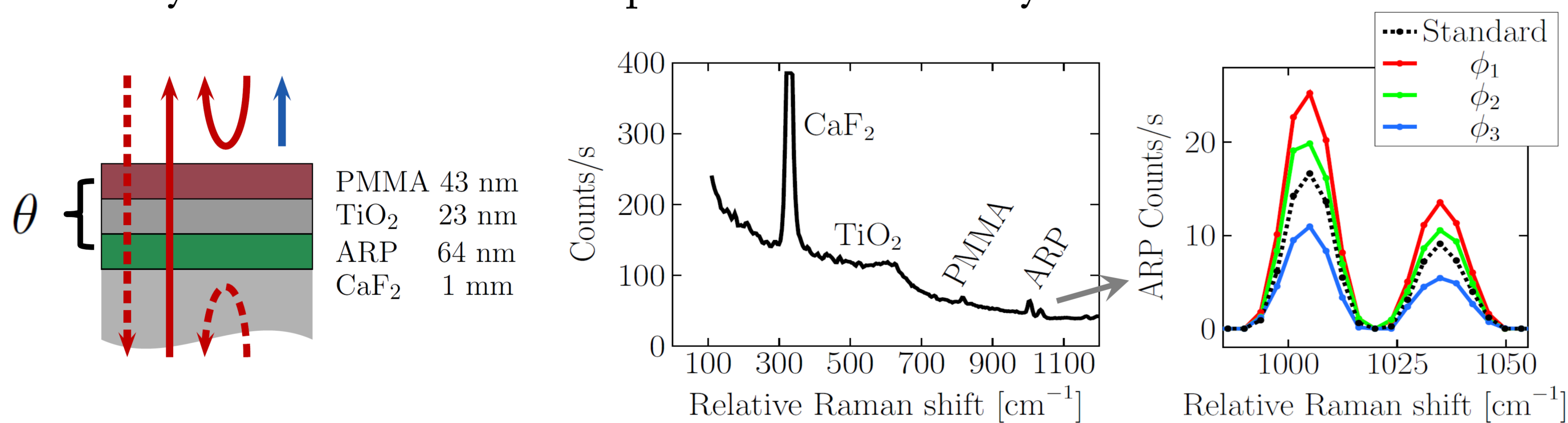
The interferometer allows us to:

- Control the phase at the sample plane
- Get rid of the phase noise.



## Results

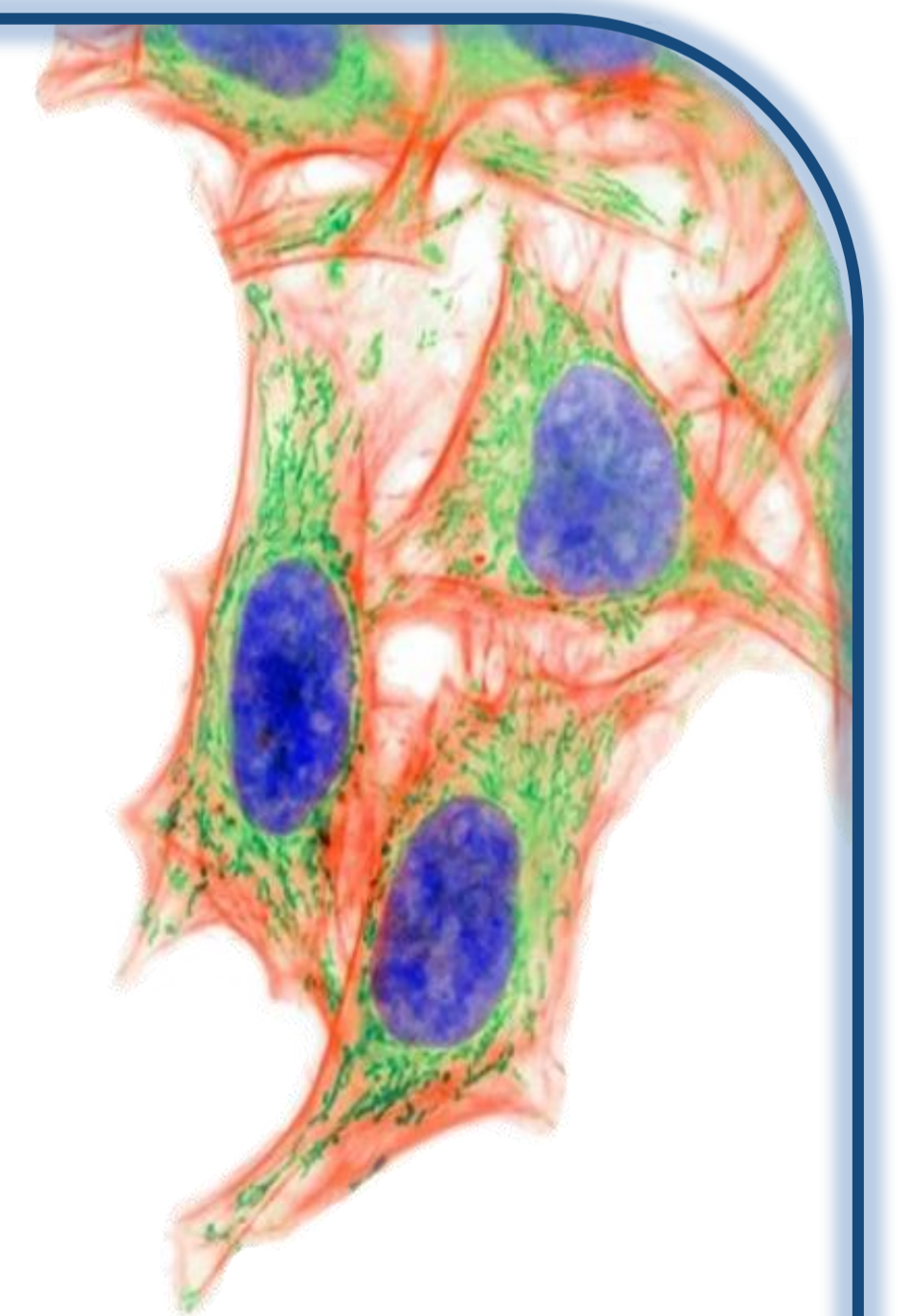
Identify materials and their separation in a nanolayer stack



- 6 nm precision
- x1.4 Raman signal

## Upcoming

- 3D Biological tomography
- Collect Raman from both sides
- Measure refractive index and physical length from nanolayers



## Conclusion

Besides increasing the signal and resolution, the proposed Raman microscopy technique provides additional advantages. It detects the chemical fingerprint and structure of the sample, something not feasible with fluorescence.

