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► **To cite this version:**

A Rouxel, A Monmayrant, S Calvez, G Almuneau. VCSEL Oxidation Monitoring Using Spectrally-Shaped Illumination. VCSEL Days 2024, Nov 2024, Toulouse, France. hal-04841824

HAL Id: hal-04841824

<https://hal.science/hal-04841824v1>

Submitted on 16 Dec 2024

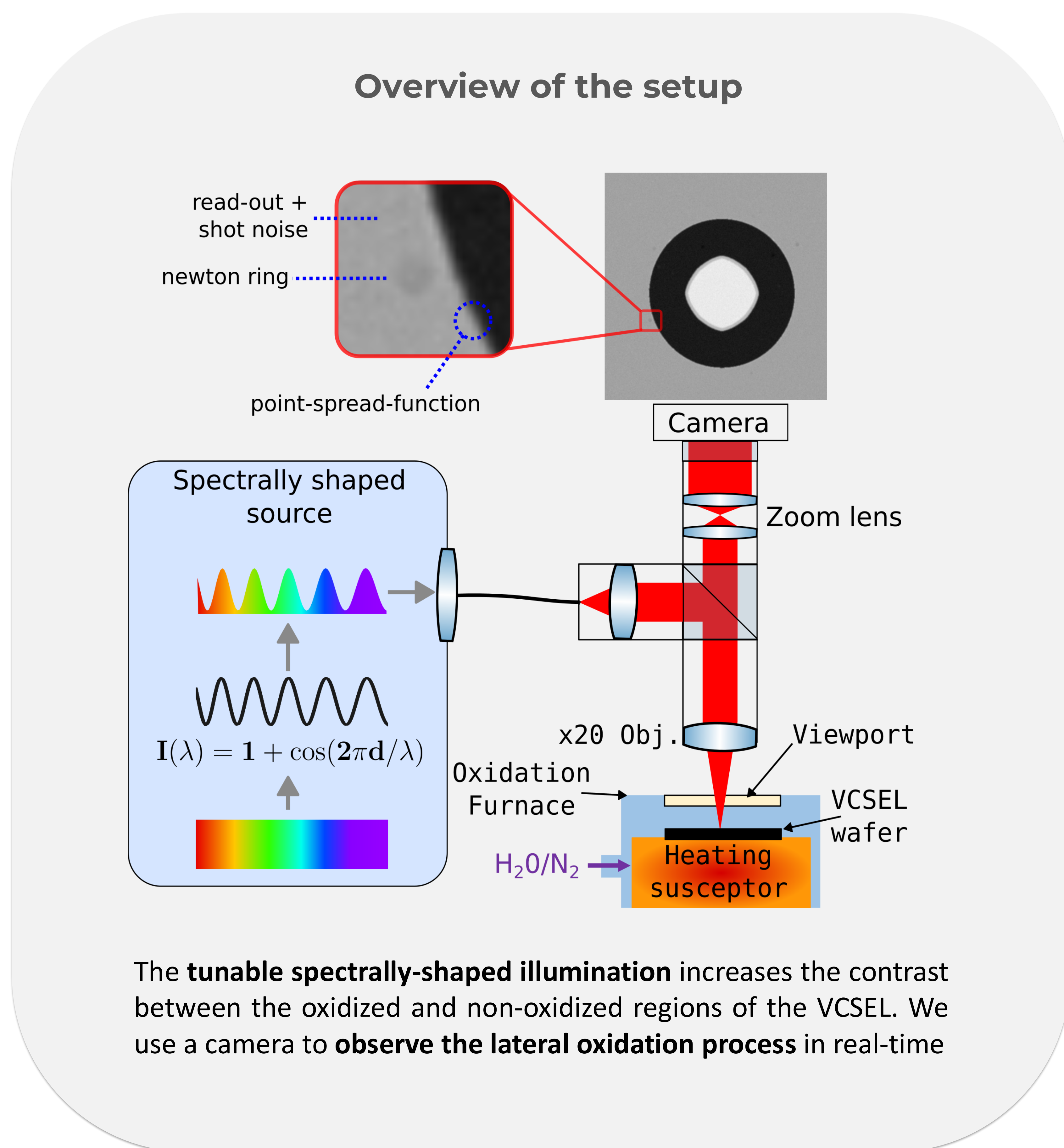
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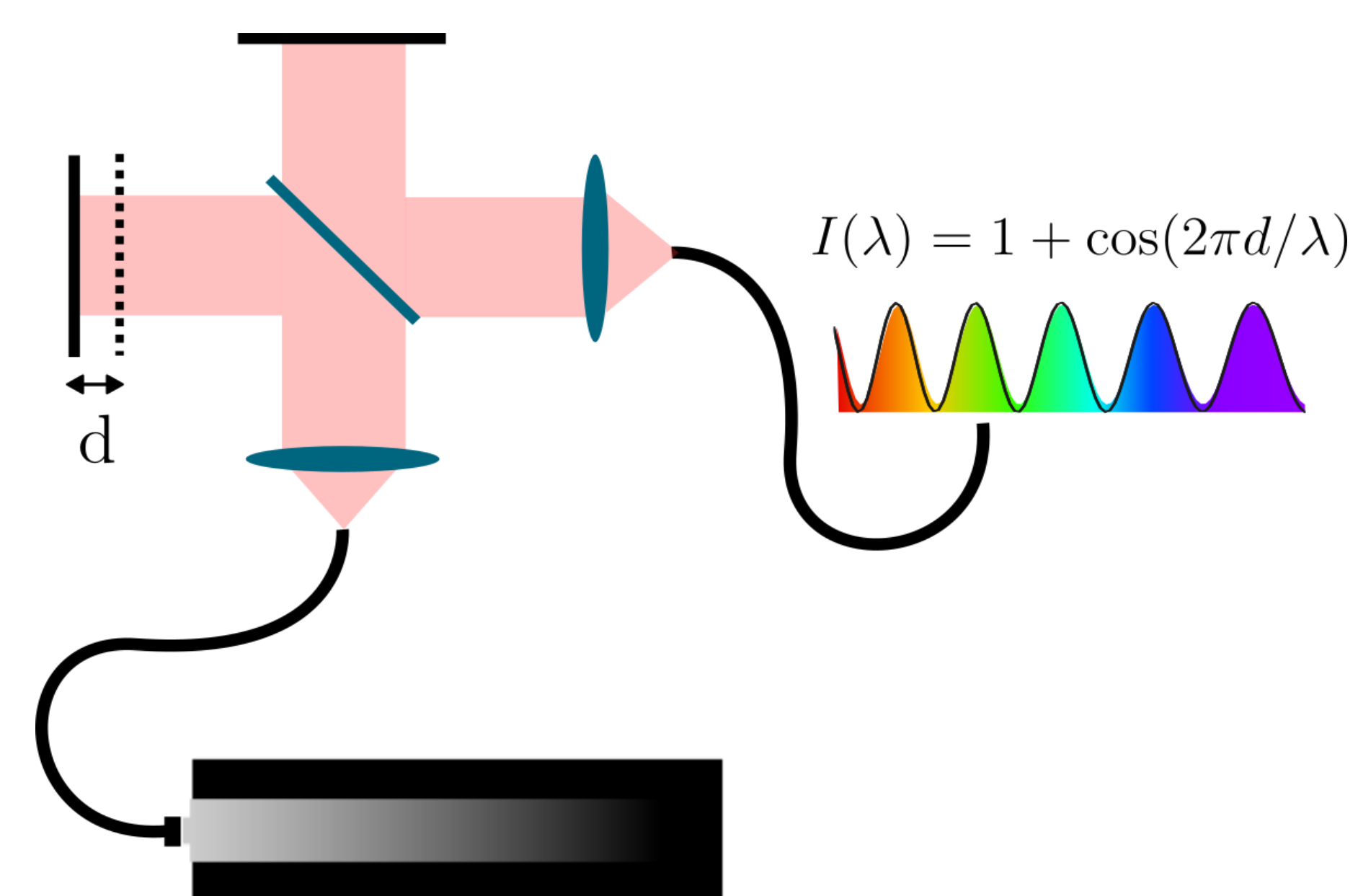
VCSEL Oxidation Monitoring Using Spectrally-Shaped Illumination

A.Rouxel, A. Monmayrant, S. Calvez, G. Almuneau

Precise **monitoring** is essential in **VCSEL fabrication**, particularly during lateral oxidation, which directly impacts the device's optical and electrical properties. Our approach uses **spectrally-shaped illumination** to enhance the detection of oxidized areas, paving the way for advanced features like anomaly detection.

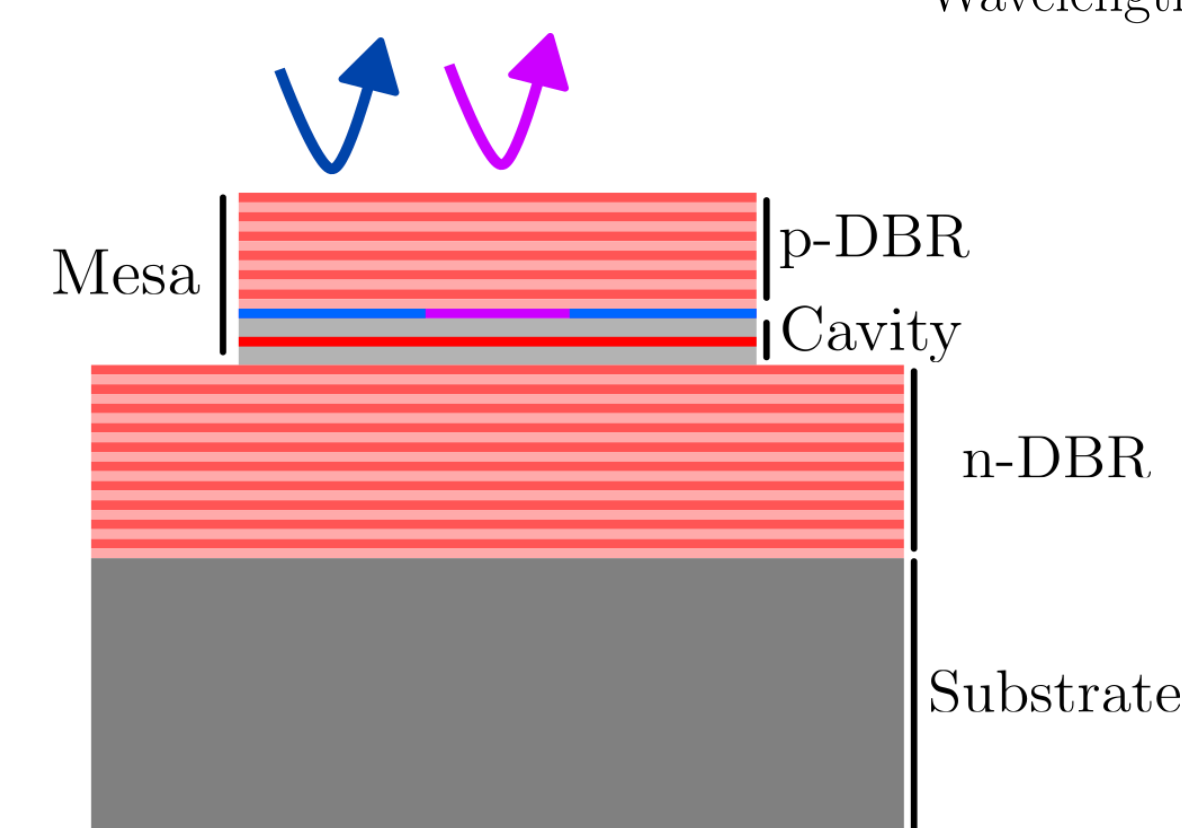
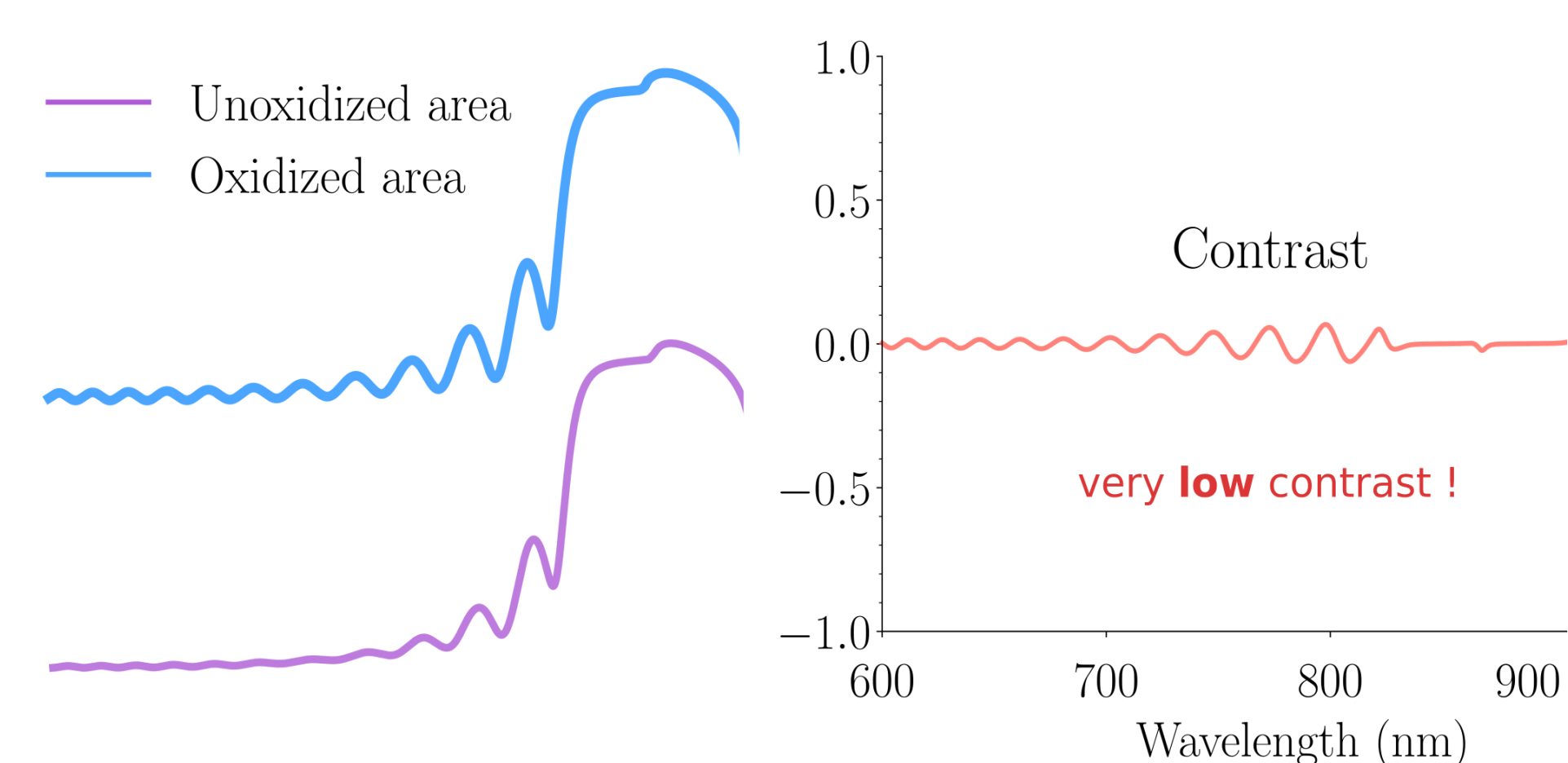


Interferometric spectral shaper

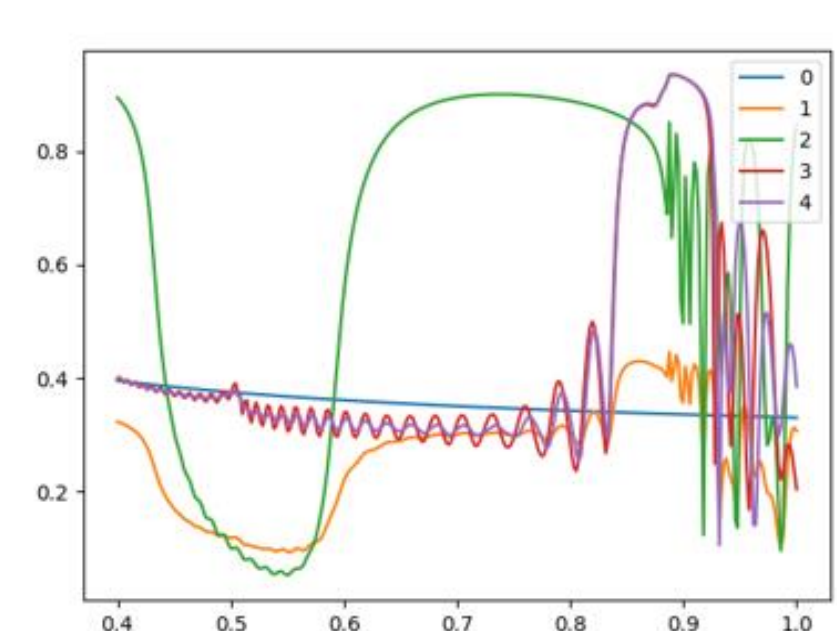


A White lamp filtered by a variable-delay **Michelson interferometer** provides a cheap and compact way to generate a sinusoidal illumination spectrum

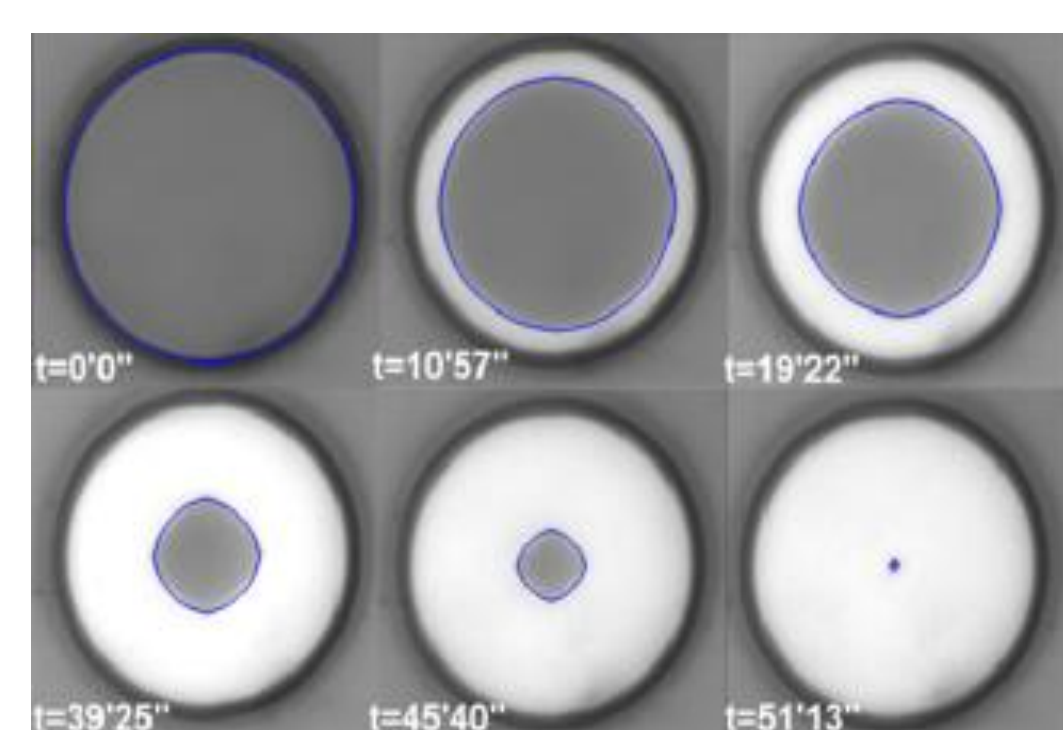
Example of reflected spectra



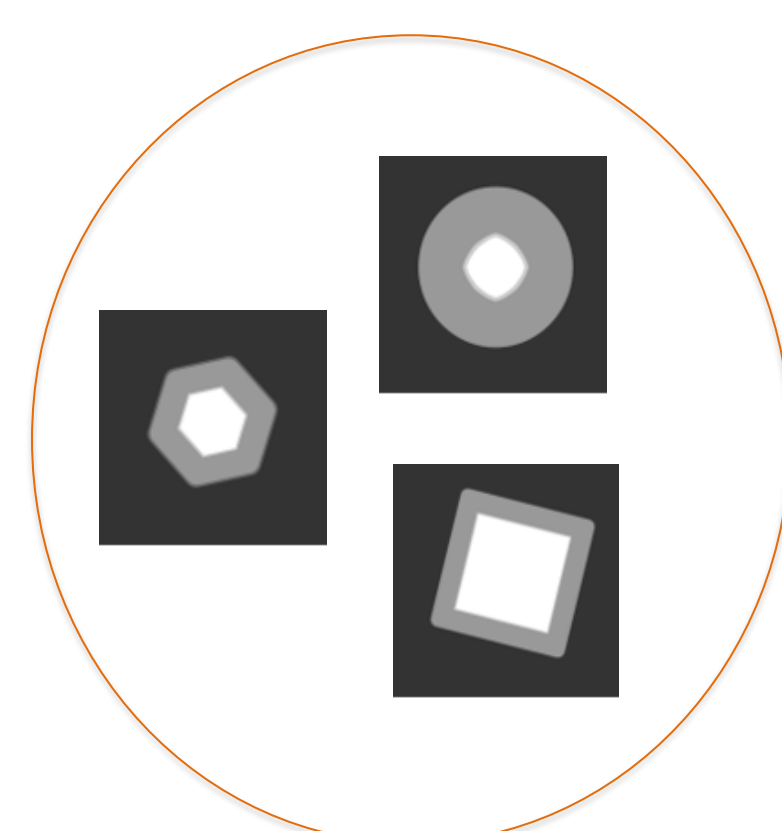
Multi-physics modeling for generating a dataset



Reflectivity spectra based on scattering matrix



Kernel-based oxidation dynamic



multiple shapes, sizes, orientation & positions

500 hyperspectral videos

- single and double aperture VCSELs
- designs for 850 and 950nm uses
- every step of the oxidation process

Comparison between approaches

