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ANGLE-DEPENDENT DIFFUSION IN 2D DIELECTRIC MONOLAYER SURFACES DISPLAYING CORRELATED DISORDER

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Mona Treguer-Delapierre¹, Philippe Lalanne², Glenna L. Drisko¹

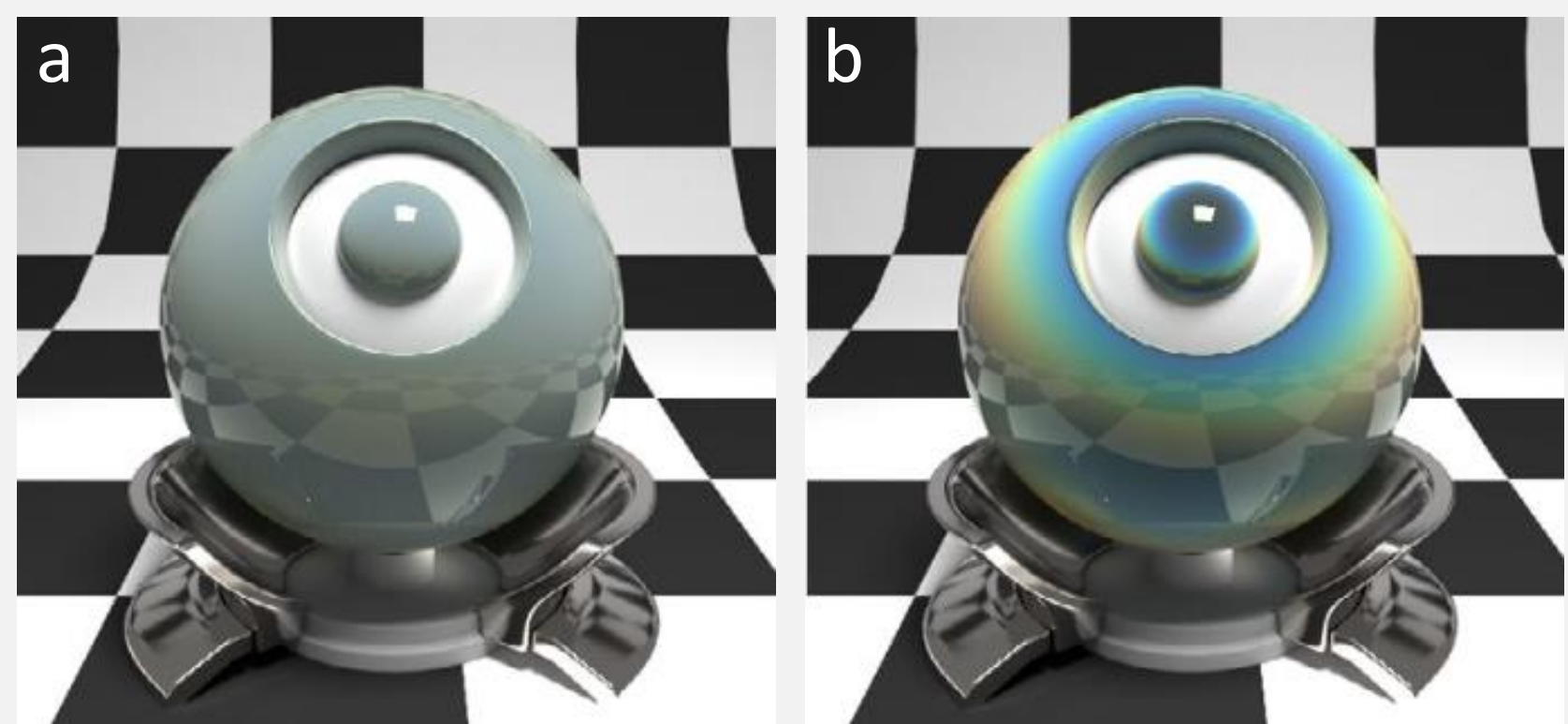
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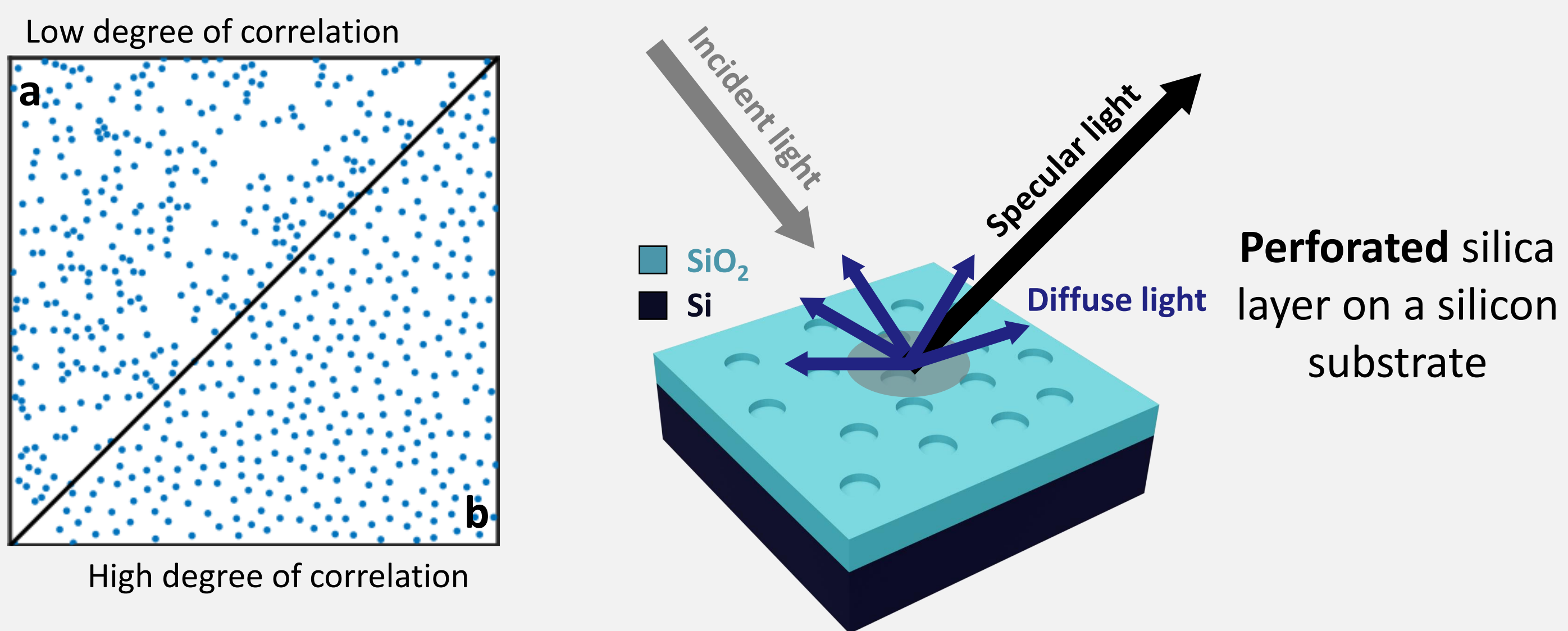
³ iLM, CNRS, Villeurbanne, France.

Context

How can appearance be tuned using nanostructured surfaces?

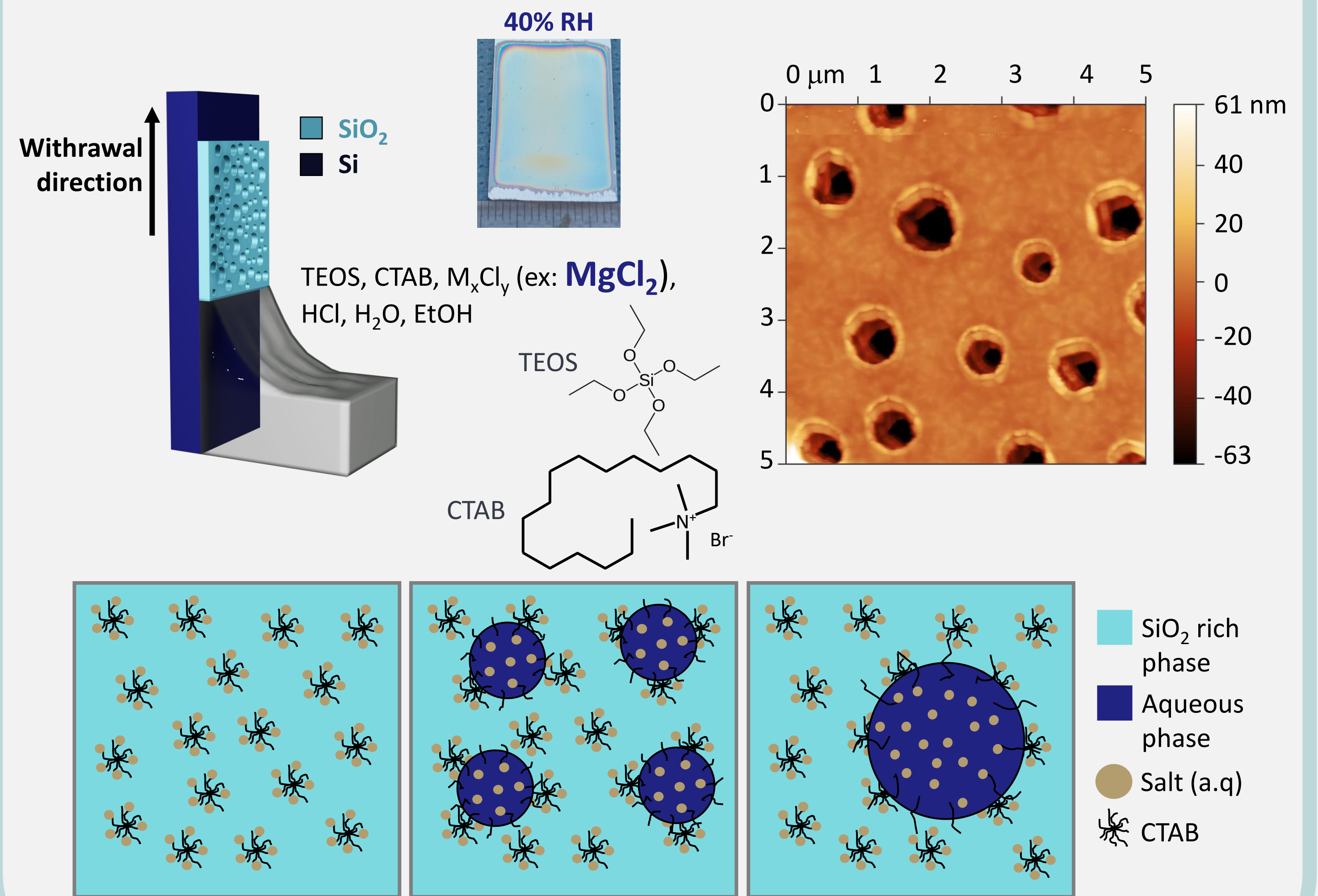


Example of visual effect with Ag NPs on a glass substrate:
(a) low degree of correlation, (b) high degree of correlation



Sol-gel fabrication of a macroperforated silica layer

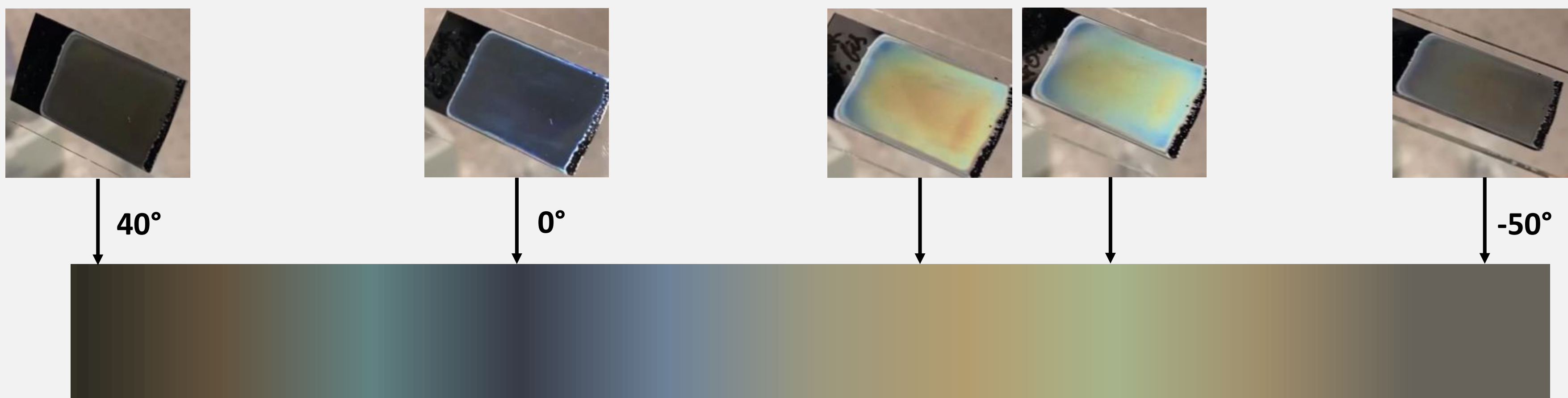
Dip-coater: T_{chamber} relative humidity, withdrawal speed



Macropore formation mechanism via salt-induced water adsorption

Conclusions and perspectives

Specular reflection only

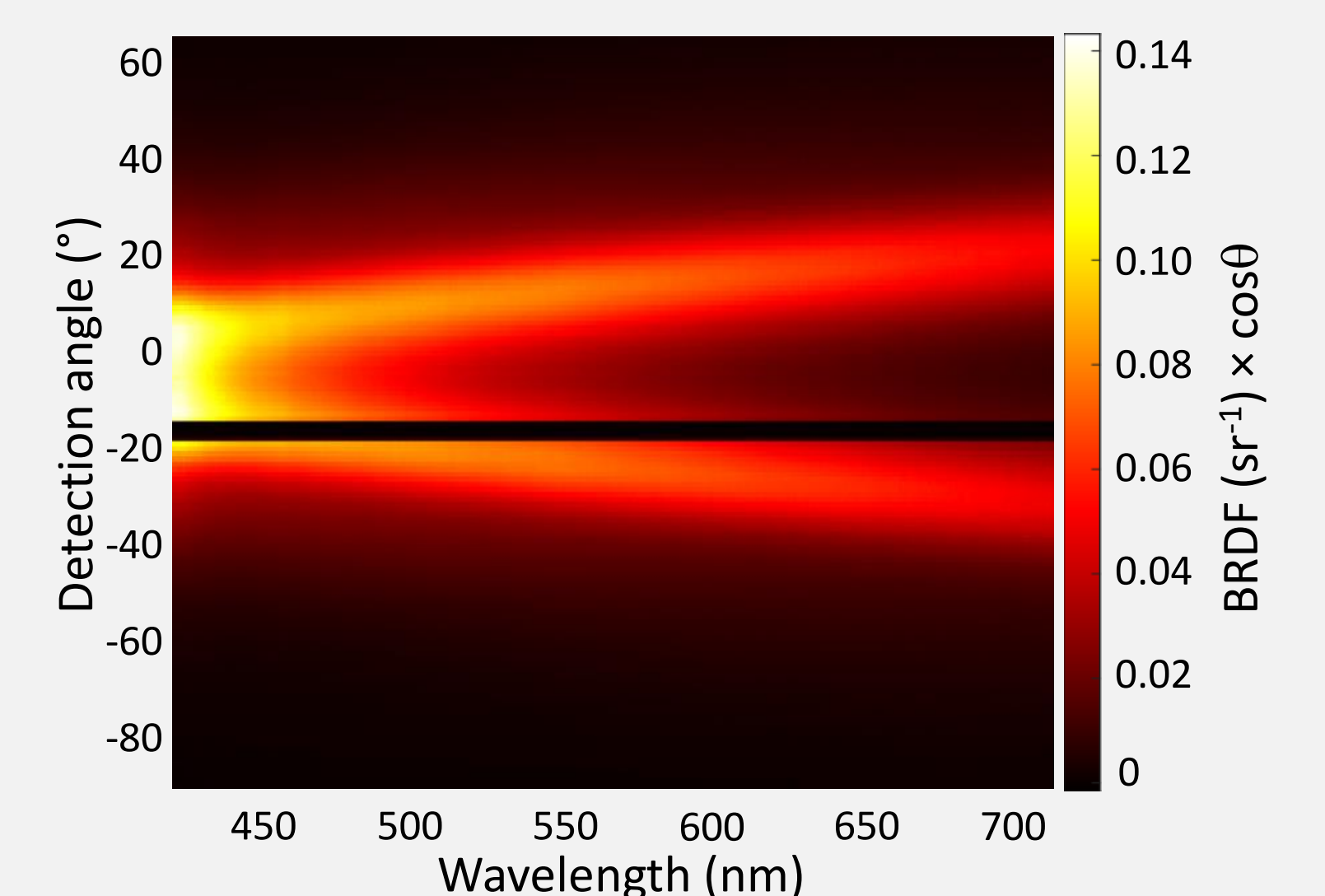
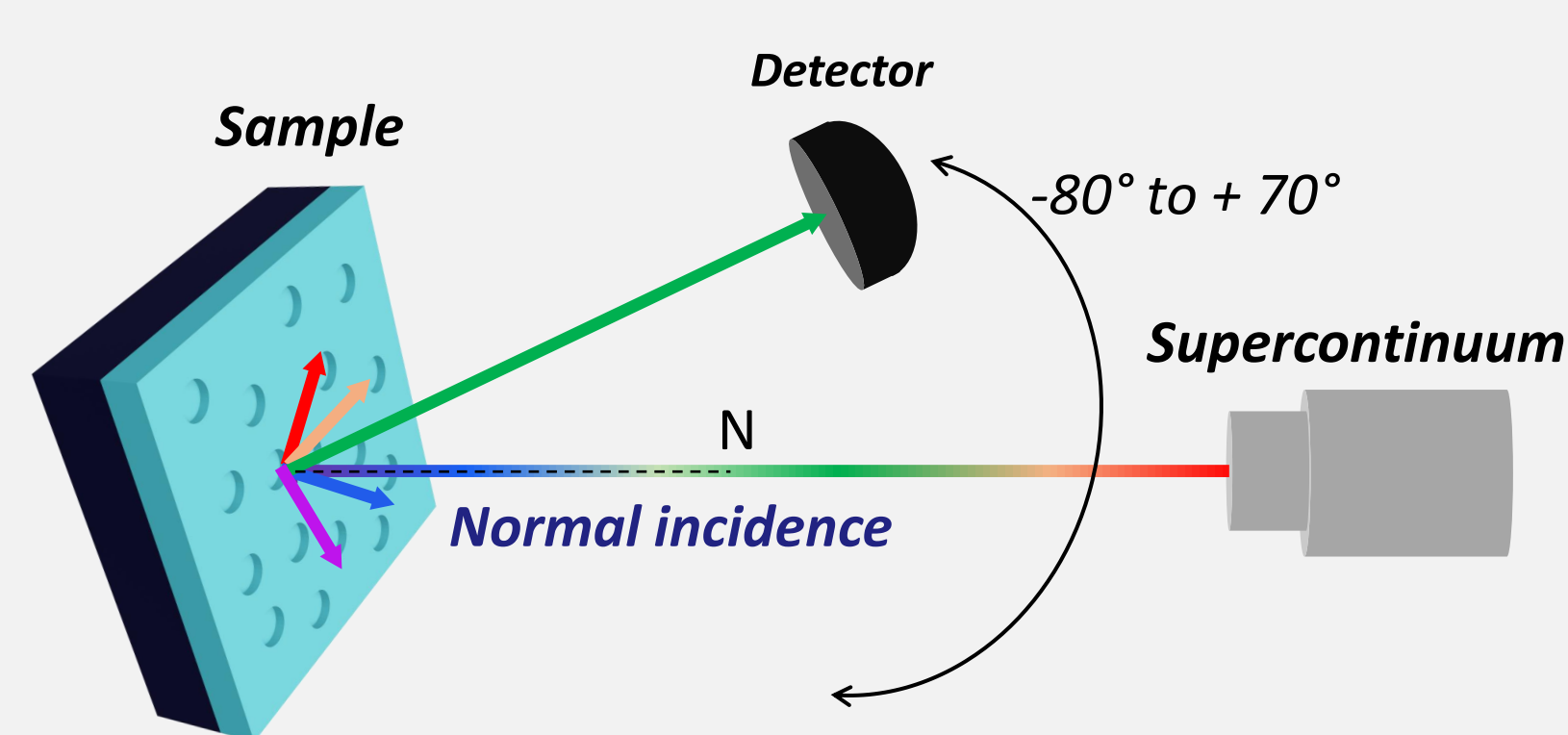
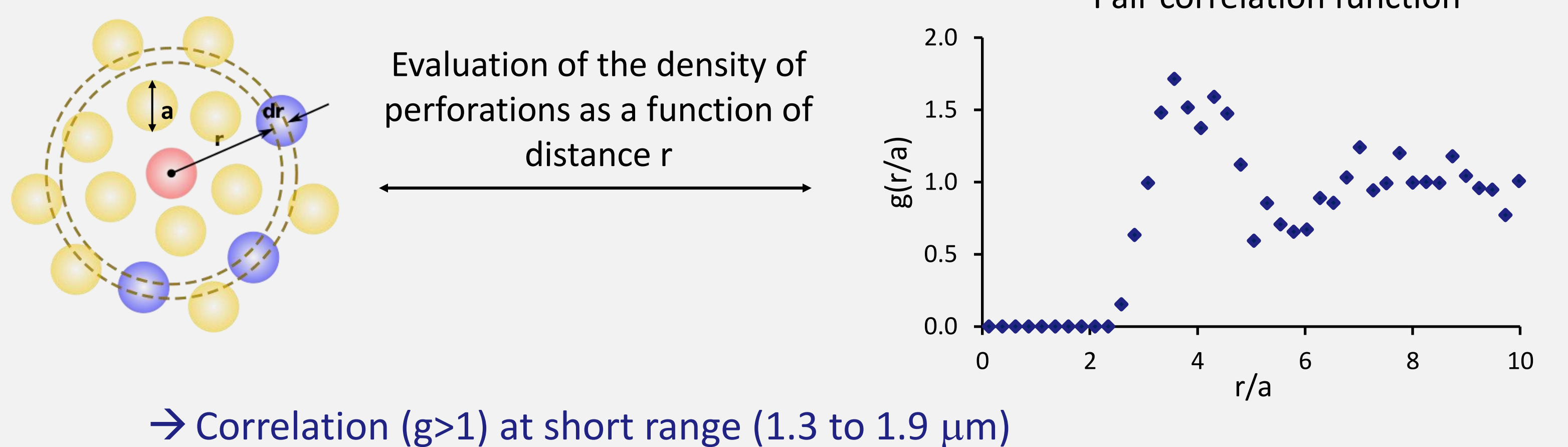
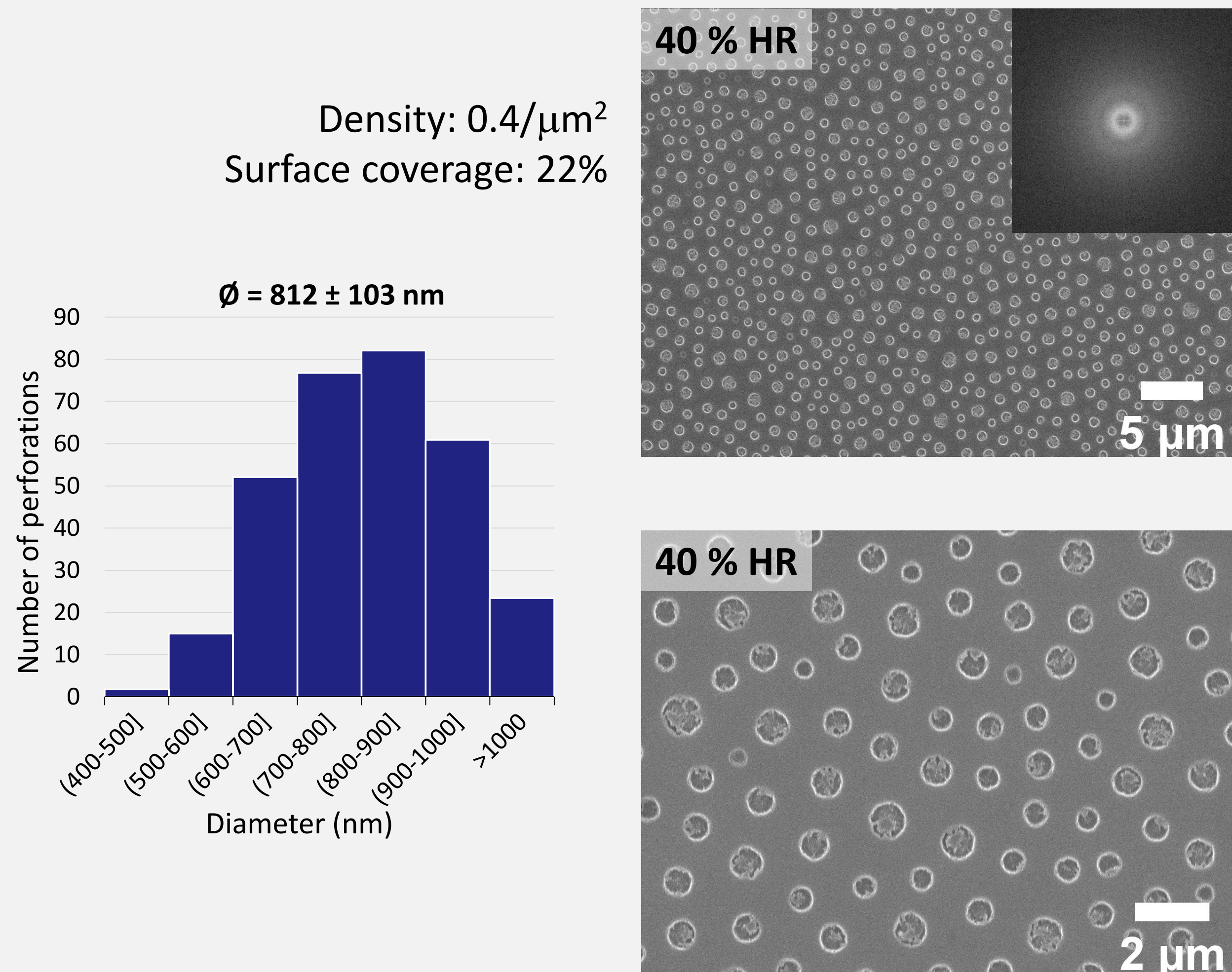


→ Angle-dependent diffusion for a film with short-range correlation

→ Tailored perforation size

→ Fabrication of high density perforated surfaces
→ Incorporation of pre-formed resonant NPs in perforations

Impact of structural correlation on the diffuse reflectance of perforated films



→ Suppression of the diffuse component near the specular axis (0°)

[1] K. Vynck et al, *Nat. Mater.*, (2022). <https://doi.org/10.1038/s41563-022-01255-9>

[2] L. Roach et al, *Nanoscale* **14**, 3324 (2022)

[3] G. L. Drisko et al, *Adv. Funct. Mater.* **24**, 5494 (2014)