Visualize the effects of nano-scale roughness sensitive on plasmonic structural coloration using multi-scale electrodynamic simulation and physically based rendering.

**REFERENCES**


**APPROACH**

- Capture the far-field bidirectional scattering distribution (BSDF) of plasmonic nanostructures (silver nanohole array) due to nano-scale roughness using finite-difference time domain (FDTD) simulations.

- Create physically based material model (.mdl) based on the far-field BSDF and render the appearance using modern PBR system.

- Analyze the color difference between smooth and rough silver nanohole array by Delta E, ΔE₀₀.

**RELATED WORK**


- Current PBR cannot capture structural color from plasmonic nanostructures, as the color is governed by electromagnetic interactions occurring at 10s nanometers.

- New scattering model required a multi-scale computational model that incorporating electrodynamic simulations and PBR to physically describe the effect of nano-scale roughness on structural coloration arising from plasmonic nanostructures at life-scale.