The CUNY Center for Advanced Technology In Photonics Applications (CUNY CAT)
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Ice Detection on Surfaces

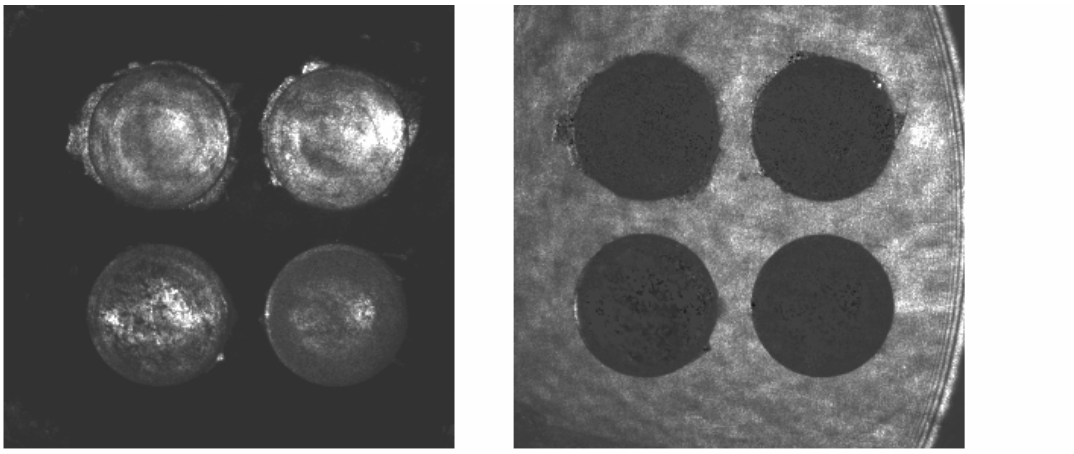
Ice on surfaces can be detected and imaged using polarized light and polarization difference imaging. Commonly available light sources, optics, and detectors are sufficient to implement this technology

Applications:

- Ice detection on aircraft wings and control surfaces
- Ice detection on roadways and bridges

Benefits:

- High sensitivity and accuracy
- Portability



a b

Different thickness of ice on a metal surface detected using perpendicular polarization (a) and polarization-difference (b) imaging.

The Technology:

Diffusely reflected light from an object illuminated with polarized light is partially polarized. One component (parallel) of the reflected light is more intense than the other (perpendicular). The degree that reflected light is depolarized depends on the optical properties of the surface. Reflection from a metallic object depolarizes light very little. Conversely, reflection from a highly scattering object, in which the light penetrates and undergoes multiple internal scattering before reflection (ice and snow), depolarizes light much more. As a result, subtraction or division of the two polarization components of the diffusely back-reflected light can be used to detect ice.

This technology opportunity sheet describes continuing efforts in this area. Several patents may have been issued or are pending and which may be available for licensing.

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