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ABSTRACT

PRESENTATION

PAPER

Denise Reichel is a professor at the School of Engineering and Architecture of the SRH University Heidelberg. She is also a dean of studies and has a professorship for basic scientific principles and mathematical methods.

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IMPROVED ALGORITHM FOR TRUE TEMPERATURE MEASUREMENT USING DUAL-WAVELENGTH THERMOGRAPHY

The following paper deals with the domain of quantitative dual-wavelength thermography, a field that hinges on the precise measurement of temperature without direct contact. At the heart of this discipline lies the concept of emissivity, a characteristic that varies with the material's surface, wavelength, temperature, and observation angle. Undoubtedly, the success of a temperature measurement hinges fundamentally on the establishment of a suitable experimental setup. However, setting aside any potential missteps in the experimental approach, it's important to recognize that emissivity plays a pivotal role in the mathematical transformation of spectral radiance into temperature. Small uncertainties in emissivity estimation can lead to large deviations in temperature reading due to the exponential relationship between the two. Therefore, the intricate interplay of the above named emissivity determining factors makes the task of accurately gauging temperature a formidable challenge. This study sets out to demystify the process of deriving this crucial parameter for contactless thermography directly from actual but incorrect temperature data. It does so without the prerequisite of understanding the material's inherent chemical or physical properties, paving the way for non-invasive temperature analysis across a diverse range of materials and conditions.