Retrieval of Temperature and Optical Functions of Specular and Rough Surfaces with Reflection Enhanced Emission Spectroscopy

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A new experimental setup allowing the simultaneous acquisition of temperature and normal spectral emissivity of specular and rough materials will be presented. The strength of the method making it widely applicable is that it does not rely on any specific intrinsic material property. After exposing the fundamentals of the method, a detailed description of the experimental implementation will be given. Then, the performance of the new technique will be investigated through the characterization of several materials with polished and rough surfaces. Benchmarking in the determination of the thermodynamic temperature with other techniques like Christiansen point emissometry [1] or pyro-reflectometry [2] will be also reported. Finally, examples of numerical extraction of the optical functions or of the light scattering characteristics of rough materials from the experimental data will complete the presentation.

References:

- [1] D. De Sousa Meneses et al.; Infrared Phys Technol; 69 (2015) 96-101
- [2] D. Hernandez et al. ; Rev Sci Instrum; 80 (2009) 094903