STRUCTURES
JOUR FIXE

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"Minkowski Functionals as Comprehensive Shape Descriptors in Physics"

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ABSTRACT

Minkowski functionals are robust and versatile shape descriptors from integral geometry that characterize additive geometric information of complex spatial structures.
In physics, they have been successfully applied to a broad spectrum of physical systems, from galaxy distributions to nuclear matter and from cellular materials to nanostructured surfaces.
This talk is an introduction to Minkowski functionals (and their generalization to tensor valuations) and how they are used in physics.
After a short overview of the mathematical background, the talk presents some recent examples from physics [1-3].

[1] Klatt and Mecke. Detecting structured sources in noisy images via Minkowski maps. EPL 128, 60001 (2019).
[2] Spengler et al. Strength of bacterial adhesion on nanostructured surfaces quantified by substrate morphometry. Nanoscale 11, 19713-19722 (2019).
[3] Klatt et al. Universal hidden order in amorphous cellular geometries. Nature Communications 10, 811 (2019).

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