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Multi-scale analysis of surface topographies by modal filtering

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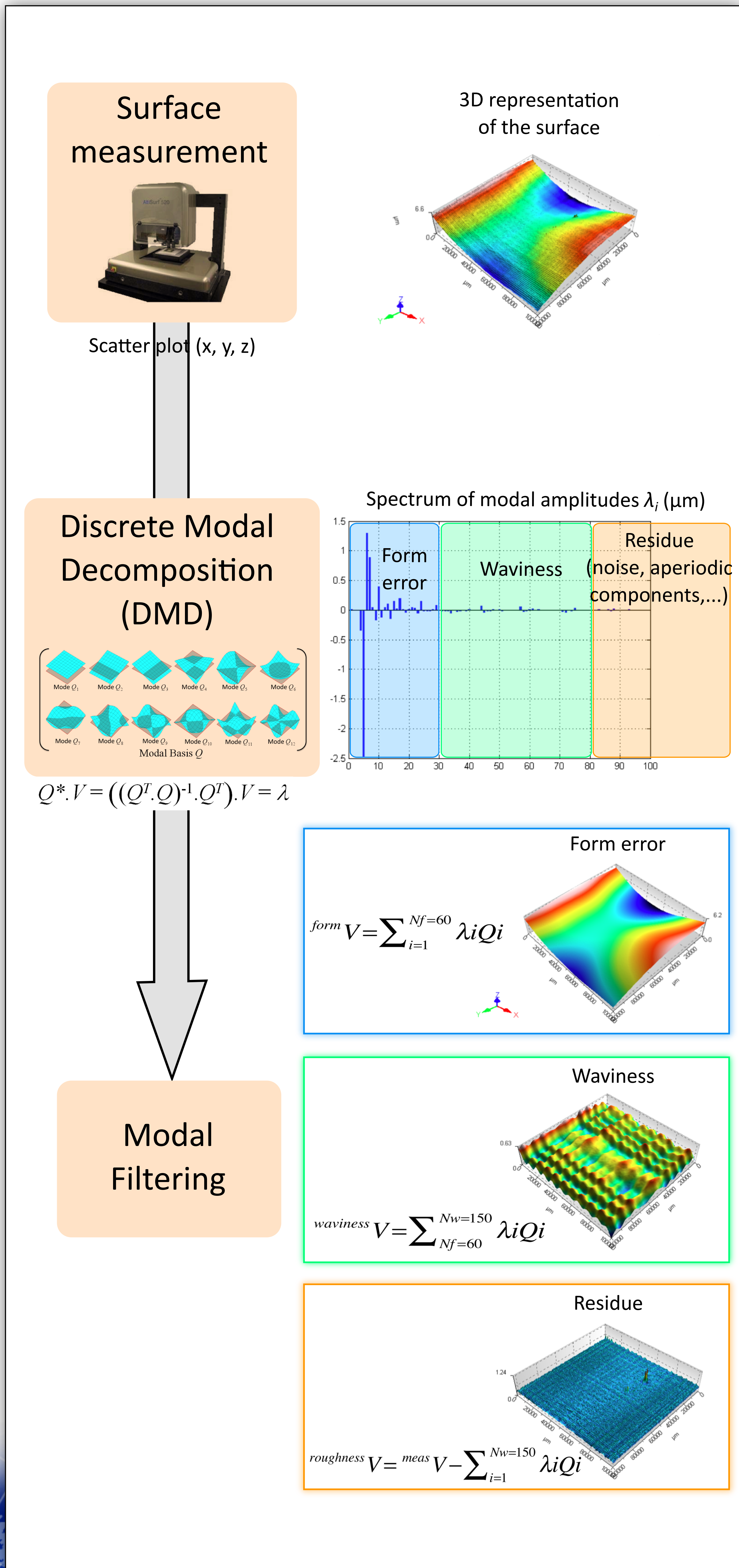
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MULTI-SCALE ANALYSIS OF SURFACE TOPOGRAPHIES BY MODAL FILTERING

Abstract

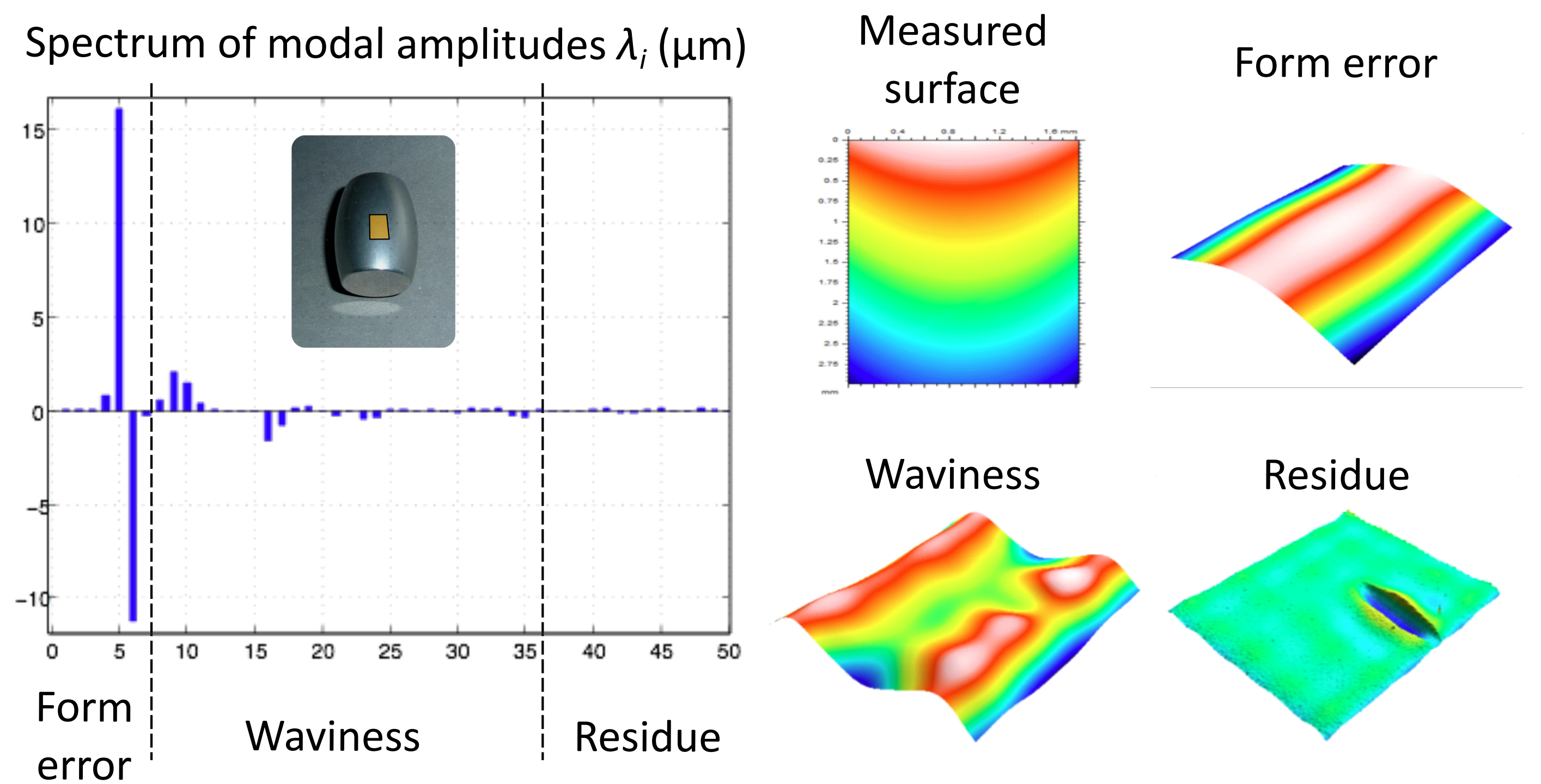
This work introduces an innovative method for the multi-scale analysis of surface topographies, which consists of applying a method based on a new parameterization. This kind of surface parameterization refers to natural modes of vibration, and is therefore named modal parameterization. It allows us to characterize the form, waviness and roughness defects of a surface. This parameterization opens up new fields of analysis, such as the appearance quality of surfaces. It is thereby possible to decompose a measured surface in a vector basis, of which vectors are represented by plane natural eigenmodes sorted by frequency and complexity. Different filtering operations can then be produced, such as extracting the primary form of the surface.

Modal filtering

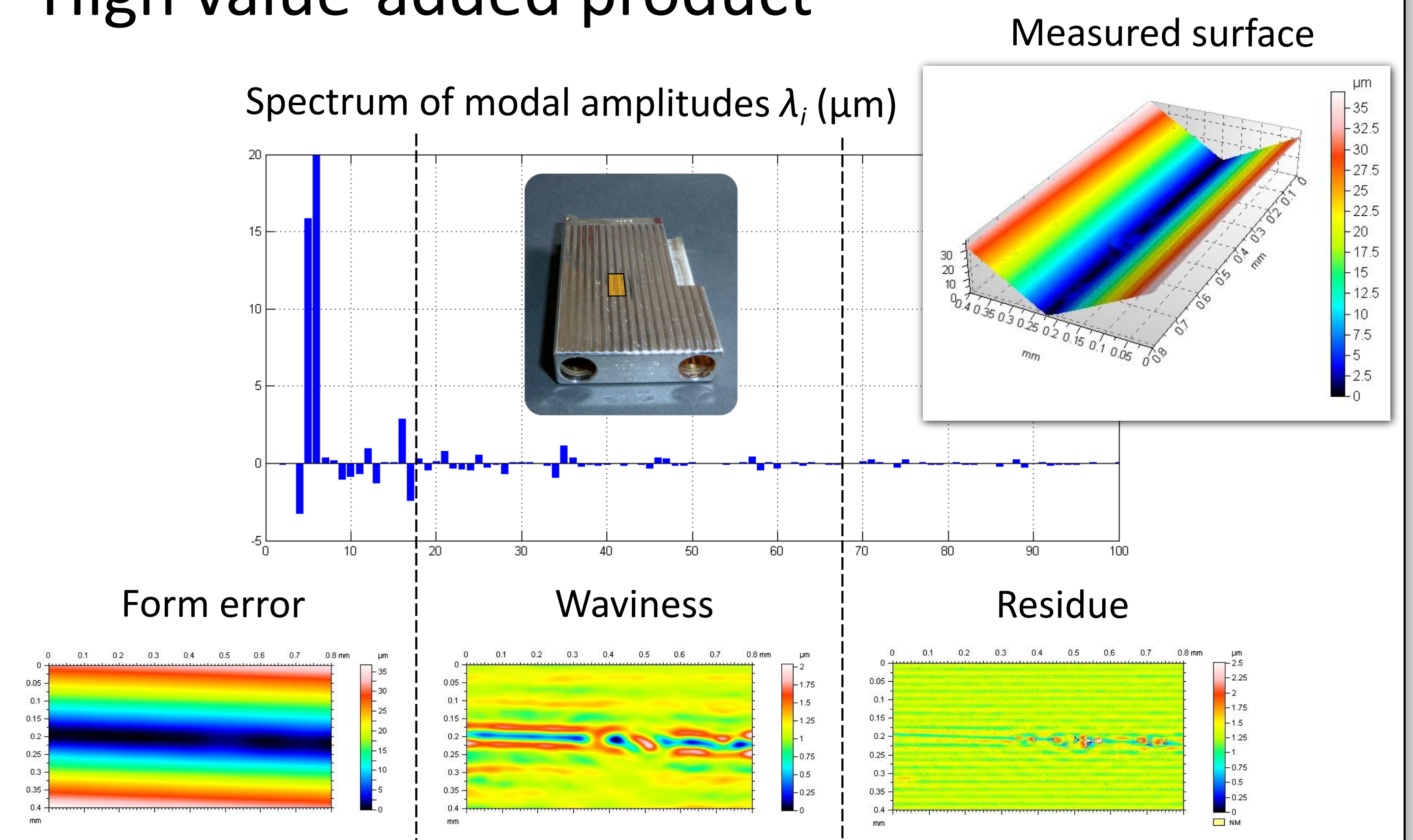


Applications

Mechanical engineering



High value-added product



Analysis of a femoral head prosthesis

