



**HAL**  
open science

## Multi-scale analysis of surface topographies by modal filtering

Hugues Favreliere, Gaëtan Le Goïc, Serge Samper, Fabien Formosa

► **To cite this version:**

Hugues Favreliere, Gaëtan Le Goïc, Serge Samper, Fabien Formosa. Multi-scale analysis of surface topographies by modal filtering. 2nd Seminar on Surface Metrology for the Americas, Oct 2012, Worcester, MA, United States. hal-00997830

**HAL Id: hal-00997830**

**<https://hal.science/hal-00997830v1>**

Submitted on 22 May 2019

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

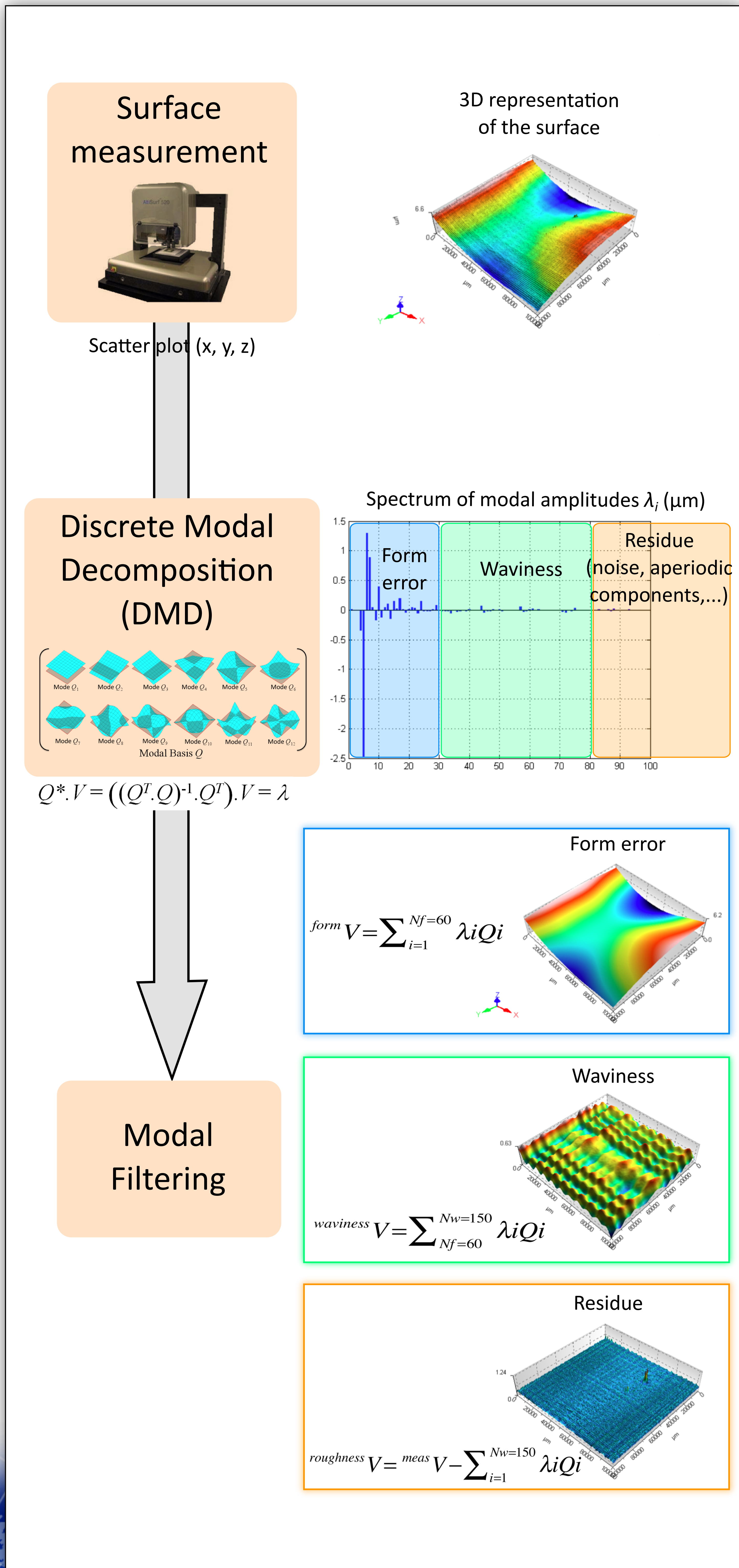
L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# MULTI-SCALE ANALYSIS OF SURFACE TOPOGRAPHIES BY MODAL FILTERING

## Abstract

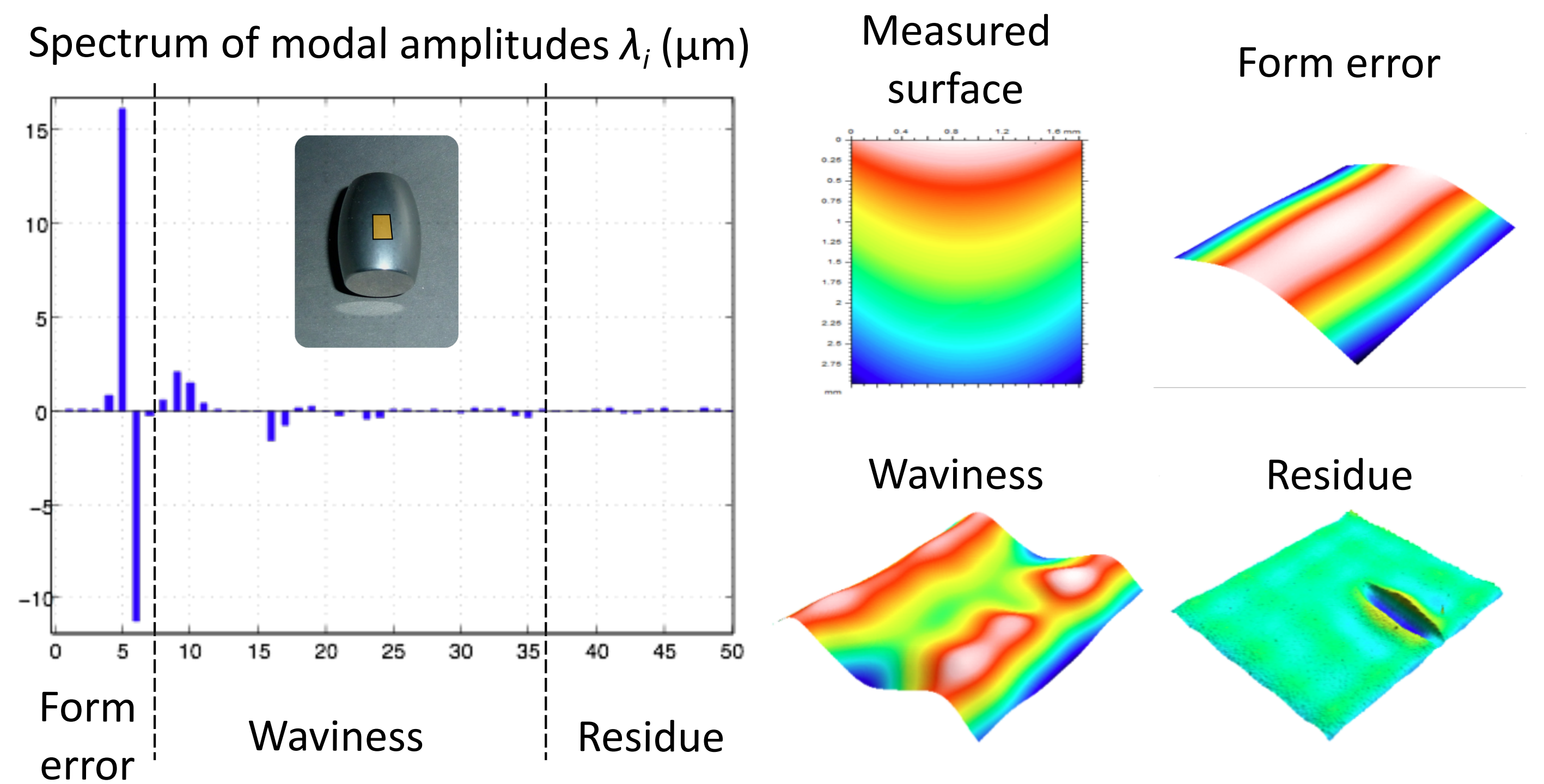
This work introduces an innovative method for the multi-scale analysis of surface topographies, which consists of applying a method based on a new parameterization. This kind of surface parameterization refers to natural modes of vibration, and is therefore named modal parameterization. It allows us 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

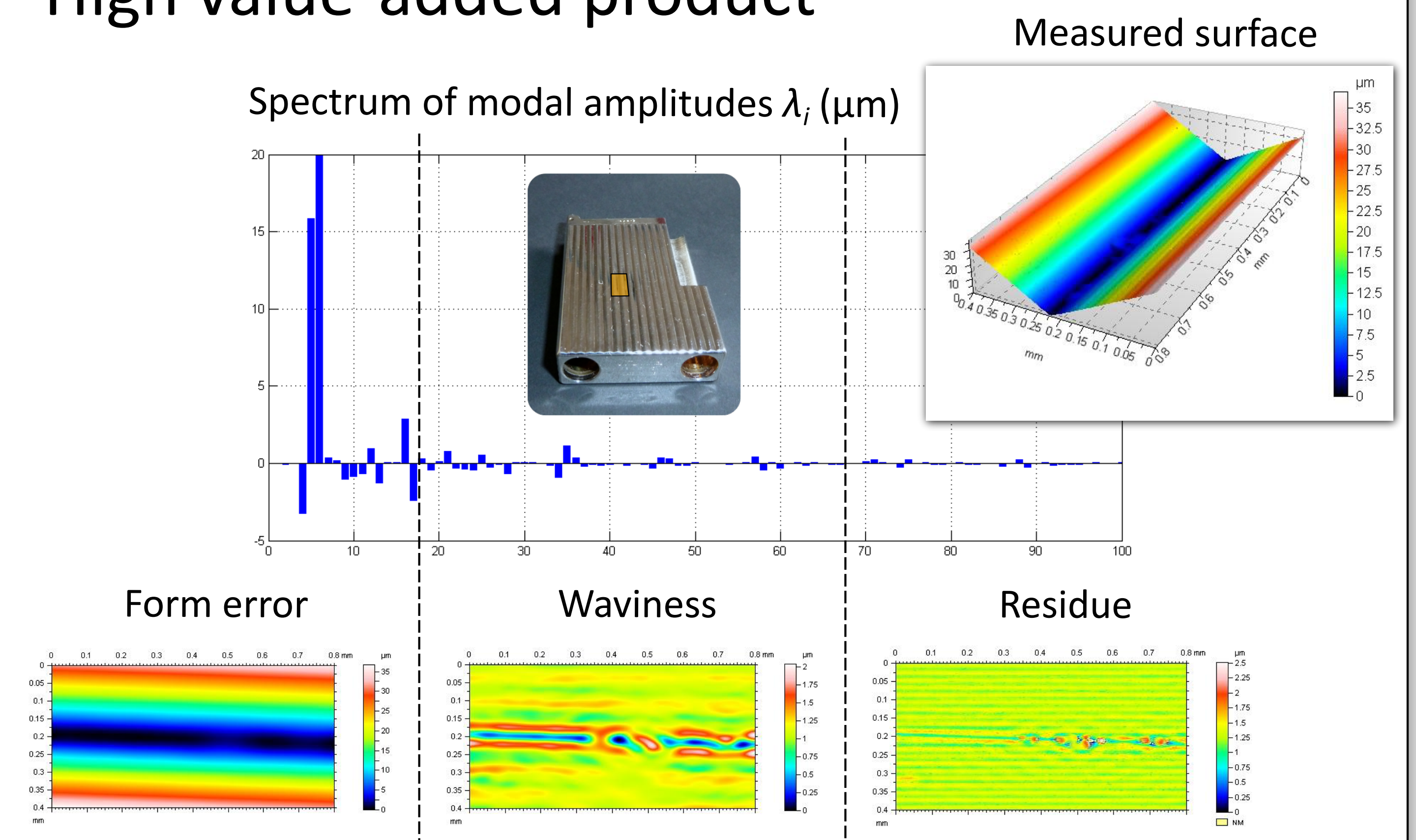


## Applications

### Mechanical engineering



### High value-added product



### Analysis of a femoral head prosthesis

