Special Issue

Innovative Methods for Structural Health Monitoring of Metallic Mechanical Components

Message from the Guest Editors

The structural integrity of metallic components plays a pivotal role in the performance, safety, and longevity of mechanical systems across numerous industries, including aerospace, automotive, energy, and manufacturing. In recent years, the demand for more resilient, lightweight, and high-performance materials—ranging from conventional metallic alloys to advanced composites with metallic constituents—has catalyzed the need for innovative monitoring strategies. Traditional non-destructive testing techniques, while well established, face increasing limitations in capturing real-time, high-resolution data under complex service conditions. This growing challenge calls for the development and implementation of next-generation Structural Health Monitoring (SHM) methodologies tailored for metallic-based materials and components.

This Special Issue aims to showcase the latest advances in SHM technologies and techniques that enhance the reliability, accuracy, and applicability of structural monitoring in metallic systems.

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Message from the Editorial Board

Metallic materials play a vital role in the economic life of modern societies; contributions are sought on fresh developments that enhance our understanding of the fundamental aspects related to the relationships between processing, properties and microstructure – disciplines in the metallurgical field ranging from processing, mechanical behavior, phase transitions and microstructural evolution, nanostructures, as well as unique metallic properties – inspire general and scholarly interest among the scientific community.

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