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**ABSTRACT**



**PRESENTATION**



**PAPER**



*Javier Rodríguez Aseguinolaza graduated in physics from the University of the Basque Country (UPV/EHU) in 2005. He obtained his doctorate in science with an extraordinary award in 2010. He is specialized in materials science, particularly in phase transitions and thermodynamics of advanced metal alloys. After gaining international experience in centers such as the Department of Materials Engineering at the Catholic University of Louvain, he continued his research career at the Basque Country's renewable energy center, CIC Energigune. At this time he lead the research group in computational modeling as well as several regional, national and European research lines and projects on new systems and materials aimed at thermal energy storage, both sensitive and phase change. As of 2017, he has been orienting his activity towards teaching and research within the Department of Applied Physics of the UPV/EHU, where he teaches classes in different degrees and masters. In addition, he carries out his research work within the Photothermal Techniques Group, focused on the development of numerical models for the detection and characterization of defects in materials using infrared thermography.*

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## DIMENSIONLESS SENSITIVITY ANALYSIS OF LOCK-IN INFRARED THERMOGRAPHY USED FOR QUANTITATIVE CHARACTERIZATION OF DELAMINATIONS

In this work an unconstrained analysis of the detection and quantitative characterization limits of lock-in infrared thermography applied to sub-surface flat flaws, so-called delaminations, is addressed. With this goal, aiming to avoid material property or experimental parameter dependant conclusions, a dimensionless numerical model has been developed. This formulation allows a noticeable reduction of the, often, large and correlated number of parameters which govern the associated thermal diffusion problem to 4 dimensionless parameters, without lack of generality. After

experimentally validating this model with calibrated planar buried flaws, the dimensionless numerical calculations have been used to feed a global sensitivity analysis. As a result, a detailed discussion is performed towards the quantitative identification of cross-correlations together with maximum sensitivity and predominancy parametric ranges of the obtained dimensionless parameters. In conclusion, the developed work provides a valuable general experimental guideline for an optimized thermographic quantitative characterization of delaminations in materials.