



Defect localization based on modulated photothermal local approach

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Résumé en anglais	<p>A new method dedicated to macroscopic-like defect localization in composite materials is presented in this paper. The proposed method is based on non intrusive measurements of the sample temperature resulting from a local periodic low energy heating. In such an approach, the low temperature increases of the investigated material avoid damages which can occur with usual flash techniques. Since thermal waves propagation is modified due to the heterogeneity induced by the defect, analysis of both modulus and phase lag spatial distributions provides relevant knowledge. Up to now, macroscopic-like defect detection based on local periodic heating has not been widely investigated. Thus, differences between the global approach and the local approach have to be pointed out in order to verify the local method's attractiveness. A mathematical model based on complex temperature is developed and provides a relevant predictive tool. In several configurations interest of local periodic heating is highlighted. For example, while several defects are included in the sample, the method capability to distinguish one from each other is shown considering a scanning approach. In order to validate these results, an experimental device has been developed. Several non destructive inspections are performed and defect detection is achieved using an infra-red camera providing observations of the sample surface.</p>
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