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Hugo Boue is currently a 2nd year PhD student at the Institute of Mechanics and Engineering (I2M) of the Polytechnical Institute of Bordeaux of the University of Bordeaux in Talence, France.

QIRT-2024-021**ABSTRACT****PRESENTATION****PAPER**

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RECONSTRUCTION OF BURIED THERMAL SOURCES USING A PARTICLE FILTERING APPROACH IN THE CONTEXT OF NON-DESTRUCTIVE TESTING

The challenges of reconstructing buried heat sources are addressed through Bayesian particle filter methodology, integrating thermal synthetic data based on quadrupole formalism or thermal experimental data from an infrared camera. The proposed approach is computationally efficient in the sense that it allows sequential updates of the depth, intensity and geometry of the defect, as new data becomes available. Compared to the Kalman filter, which is a reference

algorithm for data assimilation, the particle filter is well-suited to the problem at hand for handling non linear and/or non gaussian models. As the parameters of interest are not time-varying in the considered setting, the classical bootstrap filter is prone to degeneracies. To prevent them, the 're-sample-move' approach is preferred, which includes Markov Chain Monte Carlo steps.