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Charge-Coupled Device Based on Optical Tomography System in Detecting Solid and Transparent Objects in Non-Flowing Crystal Clear Water

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Abstract:

Tomography is a method to capture a cross-sectional image based on the data obtained by sensors, distributed around the periphery of the analyzed system. Optical tomography is one of the tomography methods which are non-invasive and non-intrusive system, consisting of emitter with detectors. Most of the available detectors systems are intrusive where sensors or probes need to be placed within the analyzed processes and this will create disturbances in the current processes. This research are conducted in order to analyze and proved the capability of laser with Charge Coupled Device in an optical tomography system for detecting difference type of opacity object exist in crystal clear water. Experiments in detecting static solid, transparent objects and moving air bubbles are conducted. The images of captured data are reconstructed based on filtered image of Linear Back Projection with Hybrid algorithms. As a conclusion, this research have successfully developed an optical tomography system that capable to capture the image of high to low opacity objects in a non-flowing crystal clear water.

Keywords: Optical tomography system; Charge-Coupled Device; laser; solid; transparent; image reconstruction

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