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Citation	He, X., Zheng, D. & Qian, K. (2019). Octal gray-code phase unwrapping for high-speed fringe projection profilometry. IWAIT-IFMIA 2019
Date	2019
URL	<a href="http://hdl.handle.net/10220/47663">http://hdl.handle.net/10220/47663</a>
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# Octal gray-code phase unwrapping for high-speed fringe projection profilometry

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## ABSTRACT

The speed of a fringe projection profilometry system is of great importance for the measurement of dynamic objects. The previous quaternary gray-code phase unwrapping method uses only five patterns to recover an absolute phase which is suitable for high-speed measurement. However, this method requires a pre-knowledge of the minimum depth and it limits the object to move in a small range of depth. To extend the measurement range, we proposed an octal gray-code phase unwrapping method, in which five patterns are required. We apply this method to different objects and analysis the experiment results. This method can recover a good-quality phase map for sample objects, while its performance is decreased when the object is complex or with an improper defocusing level.

**Keywords:** Phase unwrapping; Octal gray code; Projector defocusing; K-means clustering.