

# **Two-Wavelengths Quantum-Dot-Laser Self-Mixing Interferometry: Experiment and Modelling**

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## **Abstract:**

Single-mode self-mixing interferometry is a compact and inexpensive sensing technique applied in metrology especially in the area of velocimetry. However, in the case of higher velocities a fast and therefore expensive measuring system is required because of high self-mixing frequencies. For the first time, we use the self-mixing technique to measure the velocity of a motorized linear translation stage with the long synthetic wavelength resulting from a two-modes operation of a two-section quantum-dot laser. The long tailored synthetic wavelength allows to measure higher velocities in the range of several m/s in the easy to handle kHz regime, so that there is no need for a fast and expensive detection system.