

LABEL-FREE TEMPERATURE MICROSCOPY FOR CELLS IN CULTURE

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ABSTRACT:

Laser heating of individual cells in culture recently led to seminal studies in cell poration, fusion, migration, or nanosurgery, although measuring the local temperature increase in such experiments remains a challenge. Here, we introduce an optical microscopy technique suited to map the temperature in living cells in culture [1]. This measurements involve the use of light-absorbing gold nanoparticles as nanosources of heat [2] and a temperature mapping technique based on quadriwave lateral shearing interferometry (QLSI) measurements [3]. As it is label-free, this approach does not suffer from artifacts inherent to previously reported fluorescence-based temperature-mapping techniques [4] and enables the use of any standard fluorescent labels to monitor in parallel the cell's response. To illustrate the interest of the technique, we demonstrate the laser-induced dynamical control of the heat-shock response at the single cell level.

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