QUANTITATIVE FLOW-CYTO TOMOGRAPHY

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Abstract: Standard methodologies employed in biological research field are based on fluorescence signals. Analysis in the wide range of routines from basic research to clinical diagnosis use the staining of the sample with one or more fluorescent tags providing high specificity and high resolution in multiple microscopy techniques [1]. Recently, Fluorescence Microscopy (FM) has been combined with microfluidics to place on the market instrumentations belonging to the class of the Imaging Flow Cytometers (IFC). IFCs furnish bright-field, darkfield and multiple-channels fluorescence images of single cells passing in the Field Of View (FOV) [2]. Nevertheless, FM has the disadvantages of phototoxicity, photobleaching and also the expensive costs needed for the sample preparations. For these reasons label-free imaging methods greatly increase in the recent years. Quantitative Phase Imaging (QPI) technologies are label free method particularly developed in microscopy field and among others Digital Holography allows to numerically scan the focal distance, a properties that allow to integrate DH in microfluidics as it address the issue of the correct refocusing of multiple objects travelling at different depths. Here the capabilities of label-free single-cell imaging are presented and their implications on next future biomedical applications discussed. Static or in-flow configurations combined with DH will be showed describing recent

results and perspectives.

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