distribution and dynamics of intrachannel heating. We have systematically investigated the case of single beam optical traps. It has been found that the fluid flow behaves as an additional dissipation source reducing the magnitude of thermal loading. In addition, it causes a drastic distortion of the temperature pattern, leading, for example, to a spatial displacement between the laser focus and the hottest point in an optical trap. Flow rate has also been found to be crucial in determining the time required for thermal stabilization. When a flow rate is applied, the time required to reach a stable temperature distribution becomes shorter due to the elimination of convection currents by laminar flow rates.

By measuring thermal images of different optofluidic devices we have found that the main features observed in single beam optical traps are reproduced in more complex optofluidic devices based on PDMS and fused silica.

Results included in this work put in context the importance of flow rate in the thermal dynamics of optofluidic devices and would be of great importance in their understanding, design and use.

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