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Tesis: **"TEMPERATURE MEASUREMENT OF TRANSIENT EVENTS BY RAY DEFLECTION METHODS"**

Resumen:

In this work, we report on a performance comparison between two experimental techniques, background oriented schlieren (BOS) and fringe deflection (FD), when used for temperature measurement of phase objects. Both techniques are capable of measuring gradients of temperature fields, by employing a background image, which is imaged by a camera. The object phase under study is placed between the background and the camera. Some features of BOS and FD, such as robustness and spatial resolution, are studied. First, we give an analysis of each technique to find the optimum parameters for numerical processing. Then, by numerical simulations and experimental work we analyze their performance. The results show that FD, for typical associated displacements, was larger than that obtained by BOS. For relatively small and large displacements (0.5 pix and 7.5 pix, respectively) of the spatial structures of the background, errors tended to be rather large for both techniques. This is an important result since, currently, BOS is predominantly used for most of the practical applications where measurement of temperature fields is involved. In BOS, in order to have results with enough accuracy, it is necessary to count with specialized software or buy expensive licenses (for example, any of the Digital Image Correlation software licenses). Unlike this, the software for FD is relatively simple (as long as no complex phase unwrapping algorithms are required), with the phase extraction method (the Fourier method) being the most extensive programming part, but which can be programmed right away. This is important for industry, since costs can be reduced.