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Recherche Avancée

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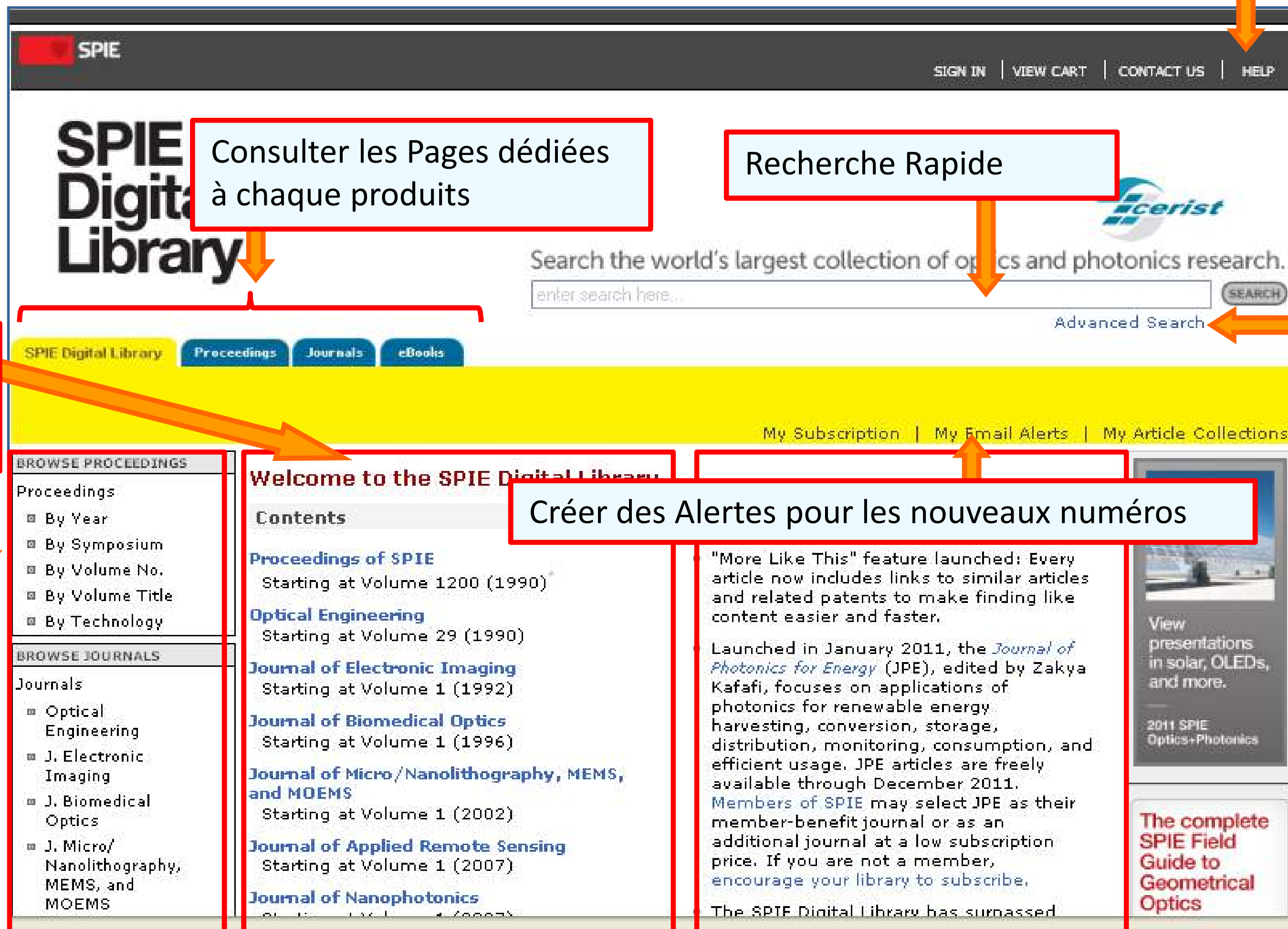

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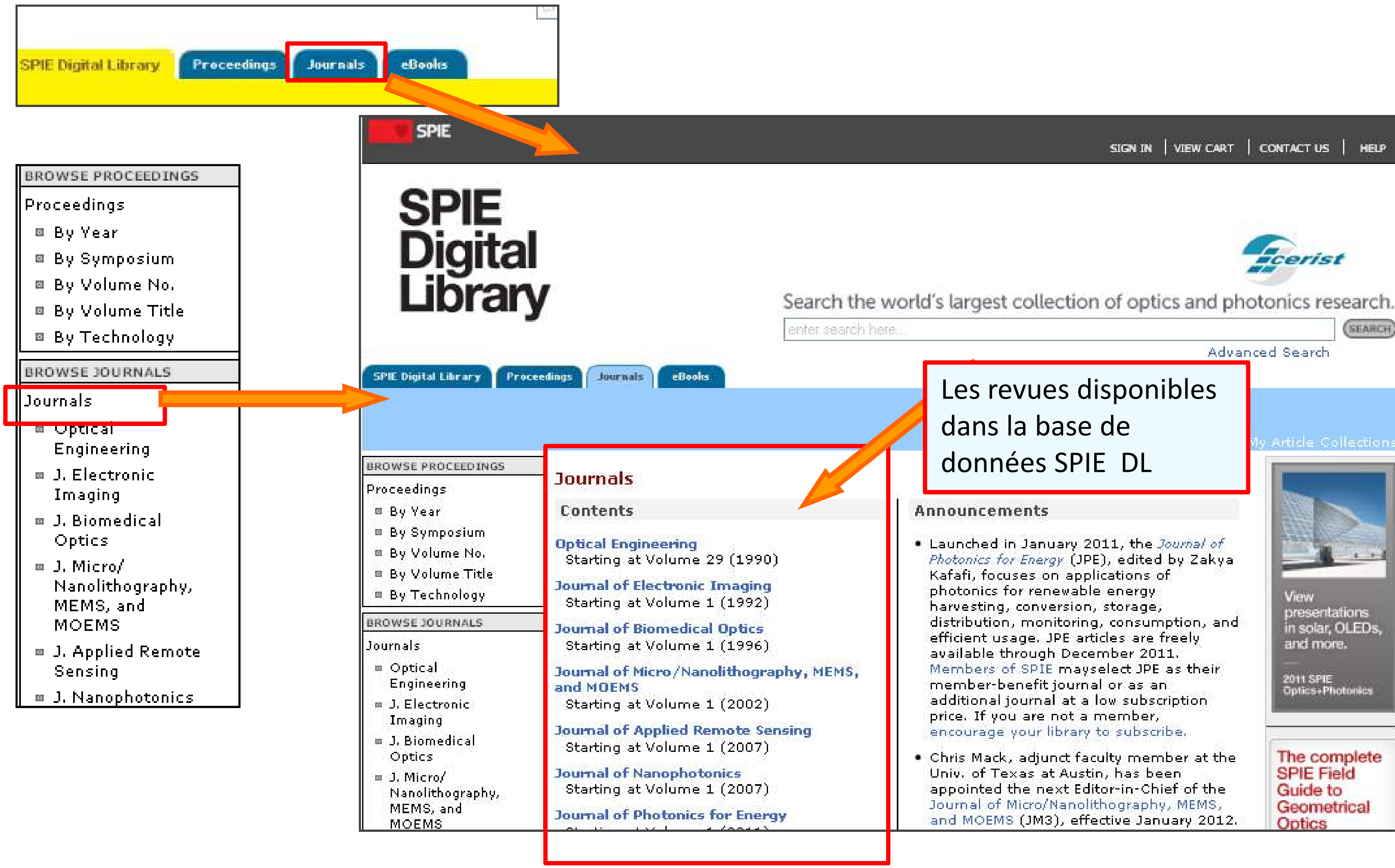

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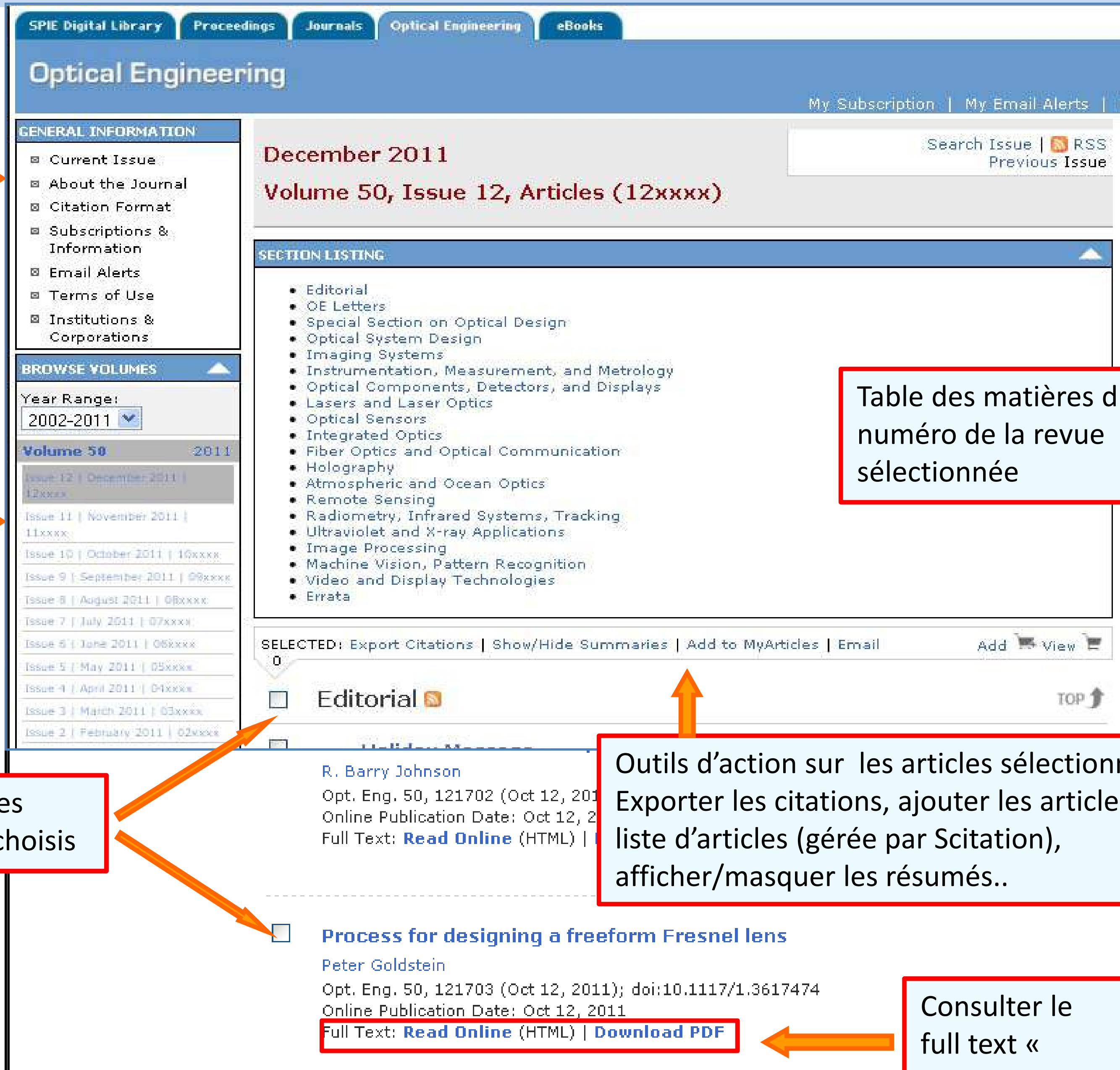

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Table des matières du dernier numéro de la revue sélectionnée

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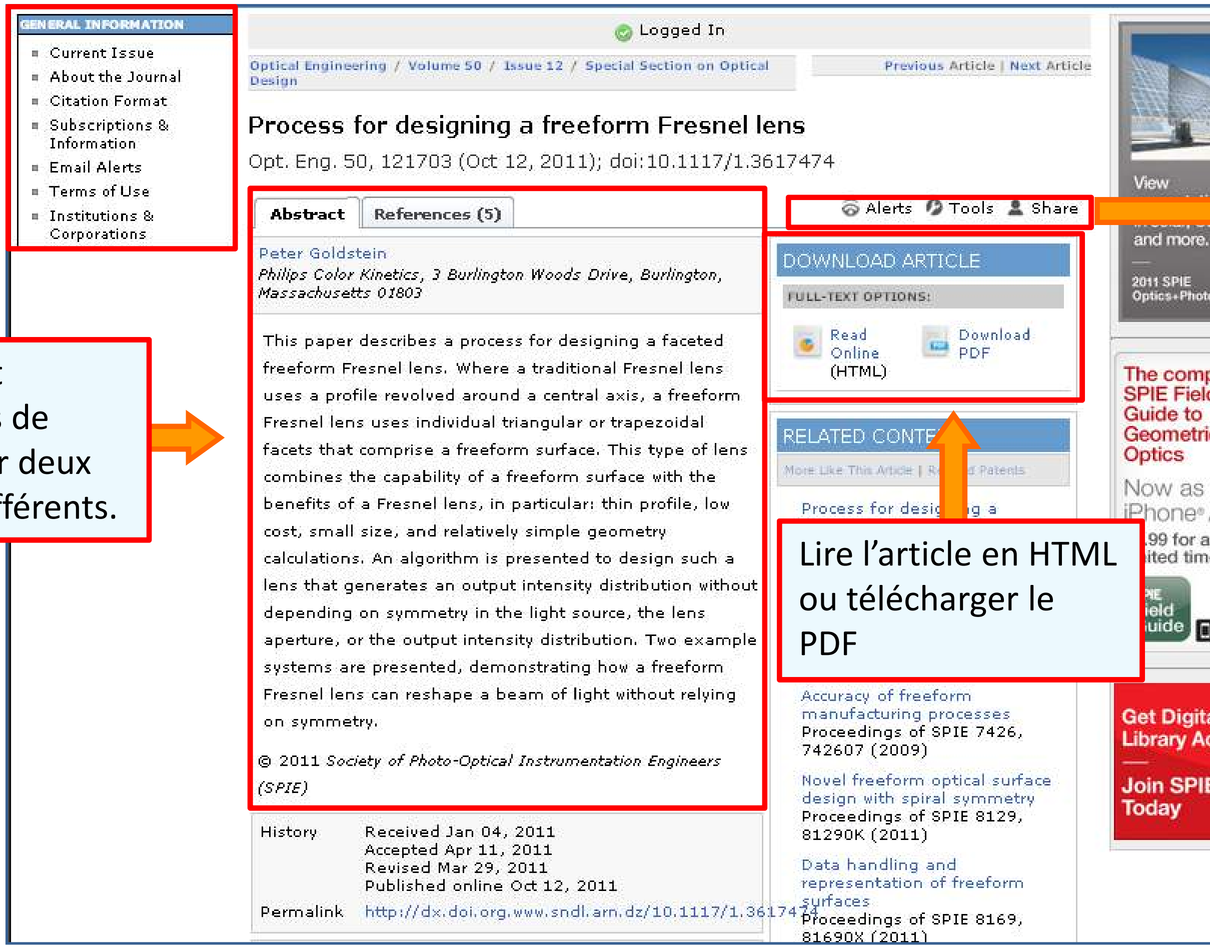

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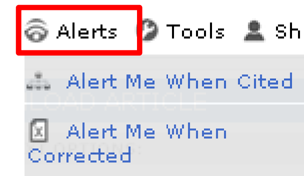

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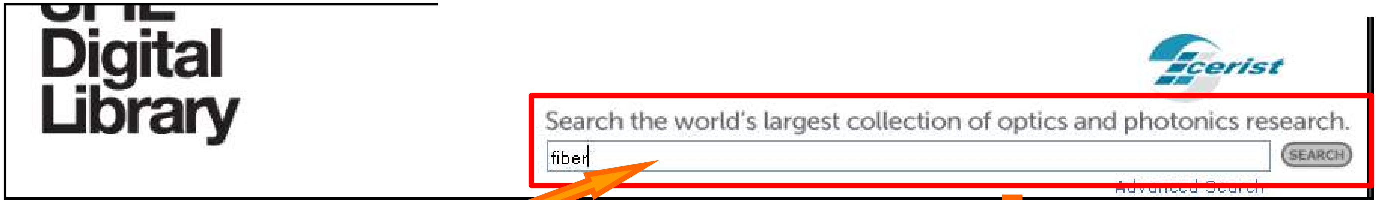

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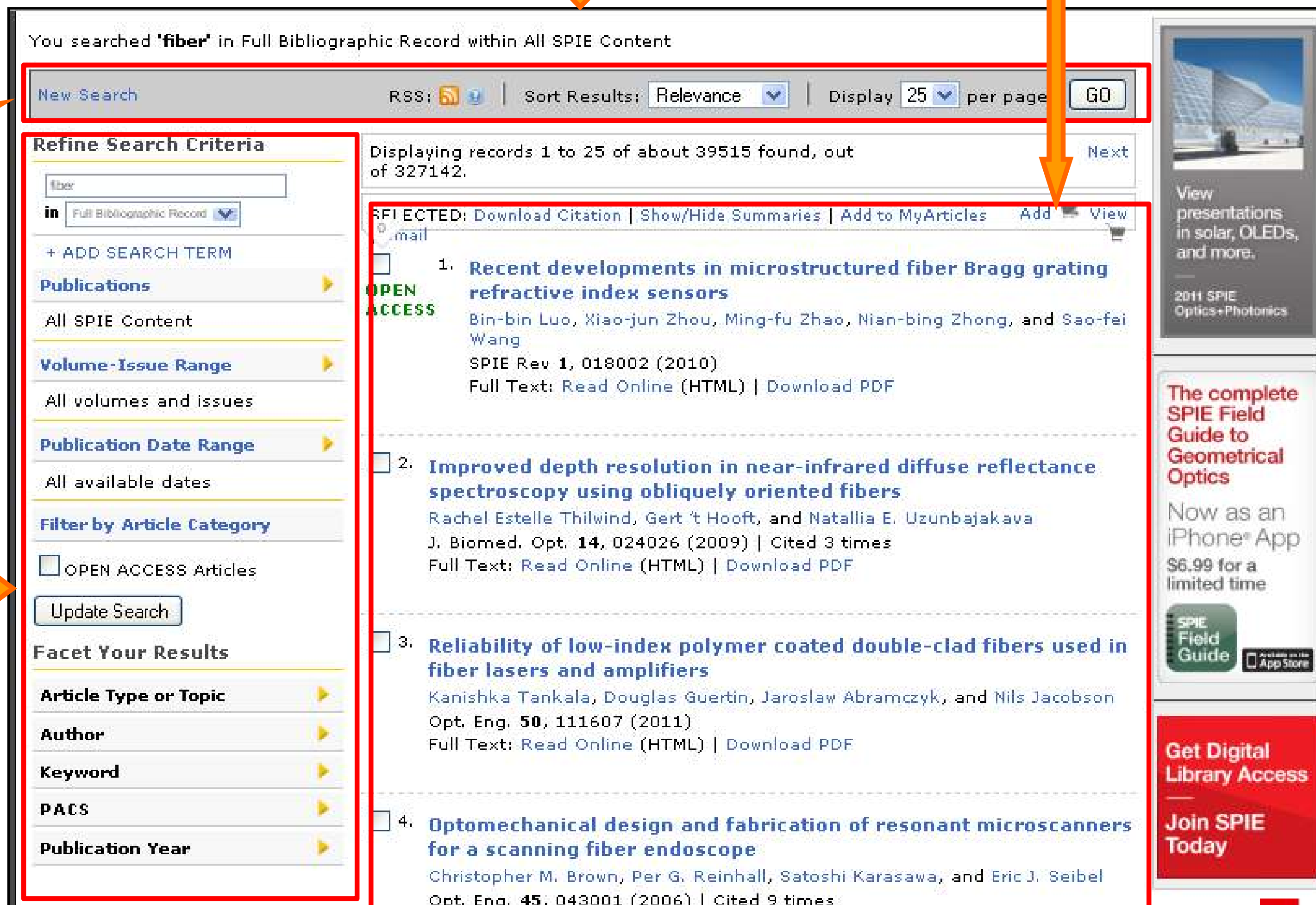

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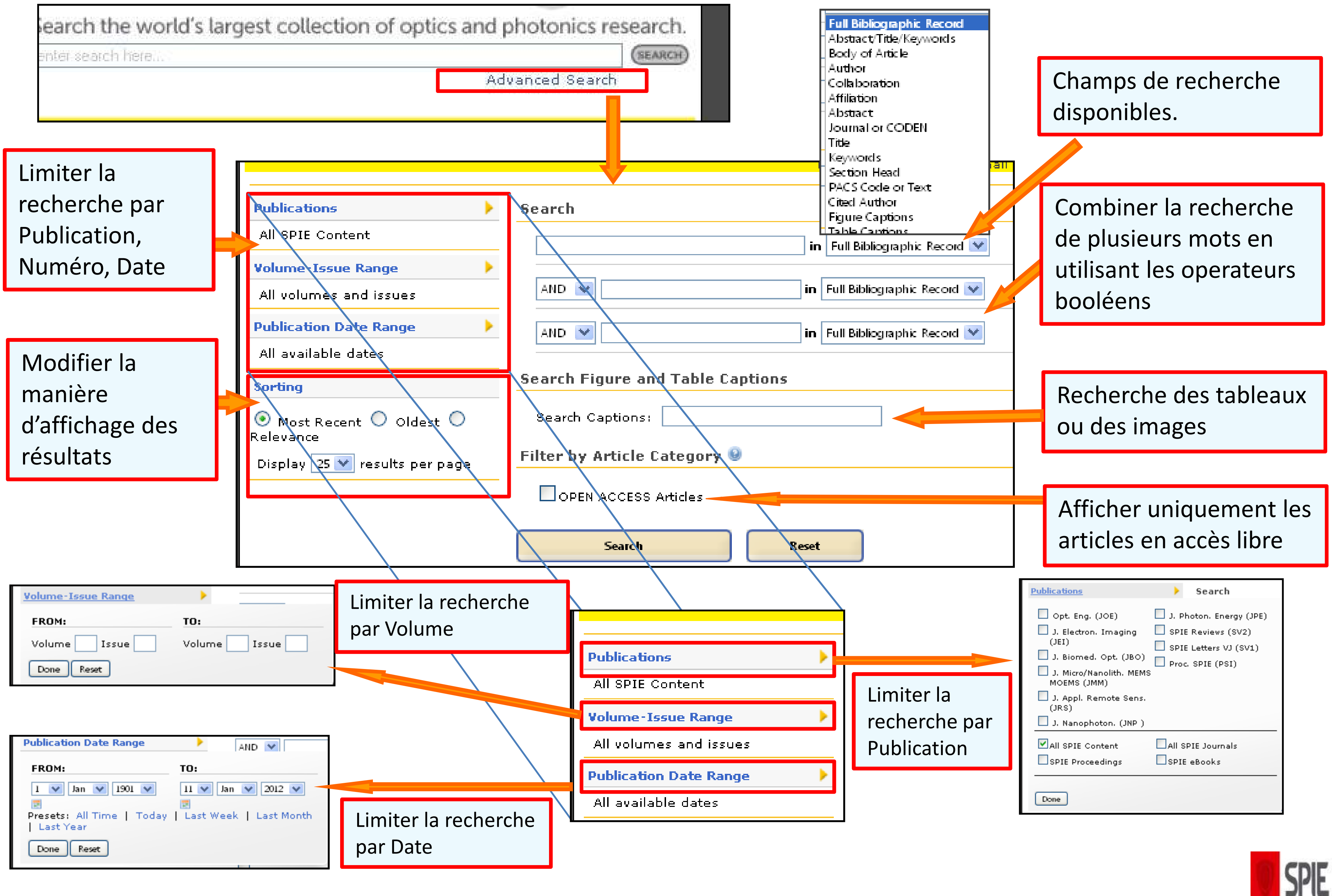

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Outils pour affiner la recherche par « publications, Date, Auteur, une autre recherche parmi les articles trouvés….etc

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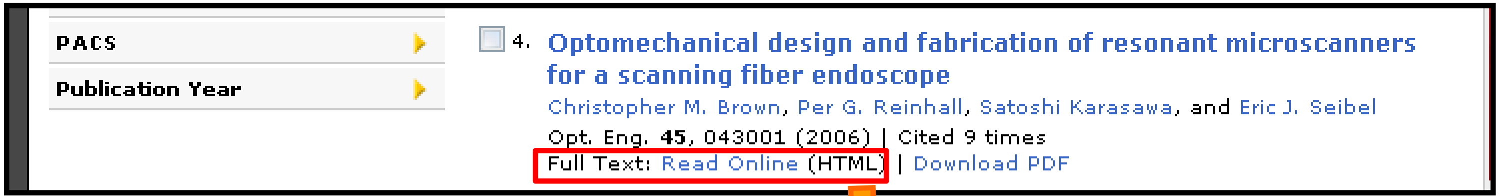

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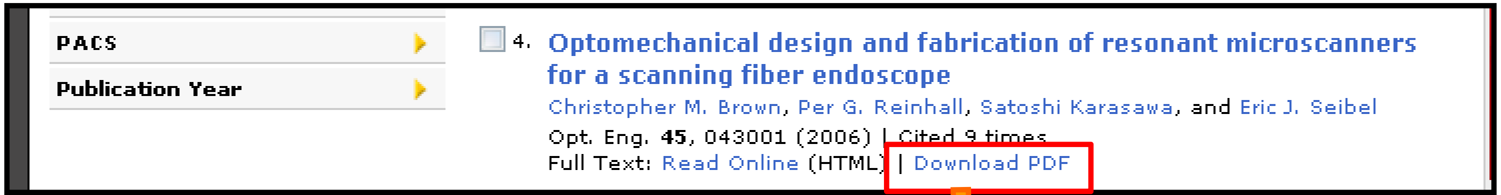

Optical Engineering 45(4), 043001 (April 2006)

Optomechanical design and fabrication of resonant microscanners for a scanning fiber endoscope

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Abstract. Scanning fiber optical endoscopy shows promise as a small, inexpensive imaging tool. Using this method of image acquisition, a scanning fiber is actuated at mechanical resonance, projecting a light spot across an imaged surface. Light backscattered from scanned spots is measured to form an image. The acquired image field of view, resolvable pixels, and frame rate are dependent on the dynamics of the optical fiber used as a resonant scanner. A finite-element analysis (FEA) model was constructed to predict scanning fiber dynamics, and compared with experimental results. A scanning fiber microfabrication process was developed that allows for the controlled manufacture of fiber scanners. Experimental results confirm that the theoretical model was accurate in predicting the system transfer function with less than 6% error in amplitude and less than 10% error in resonant frequency at the first two resonant modes of a cylindrical and a microfabricated fiber. The scanning fiber microfabrication process proved to be capable of repeatably etching notches in optical fibers as small as 2.00±0.05 mm in length and 15±2 μm in diameter. FEA was used to predict the effect of geometry change on microfabricated fiber scan dynamics, yielding candidate designs chosen for enhanced performance of future scanning endoscopes.
[DOI: 10.1117/1.2188387]

Subject terms: endoscope; optical scanning; resonant scanner; optomechanical design; microfabrication.

Paper 050220 received Mar. 22, 2005; accepted for publication Aug. 17, 2005; published online Apr. 3, 2006.

1 Introduction

Scanning fiber endoscope (SFE) technology shows promise as a small, inexpensive imaging tool suitable for microen-

properties of the SFE. There are three specific objectives for this work: (1) construct a model th... predict dynamic properties—displacen... frequency—of optical fibers used in a scanning fiber sys-

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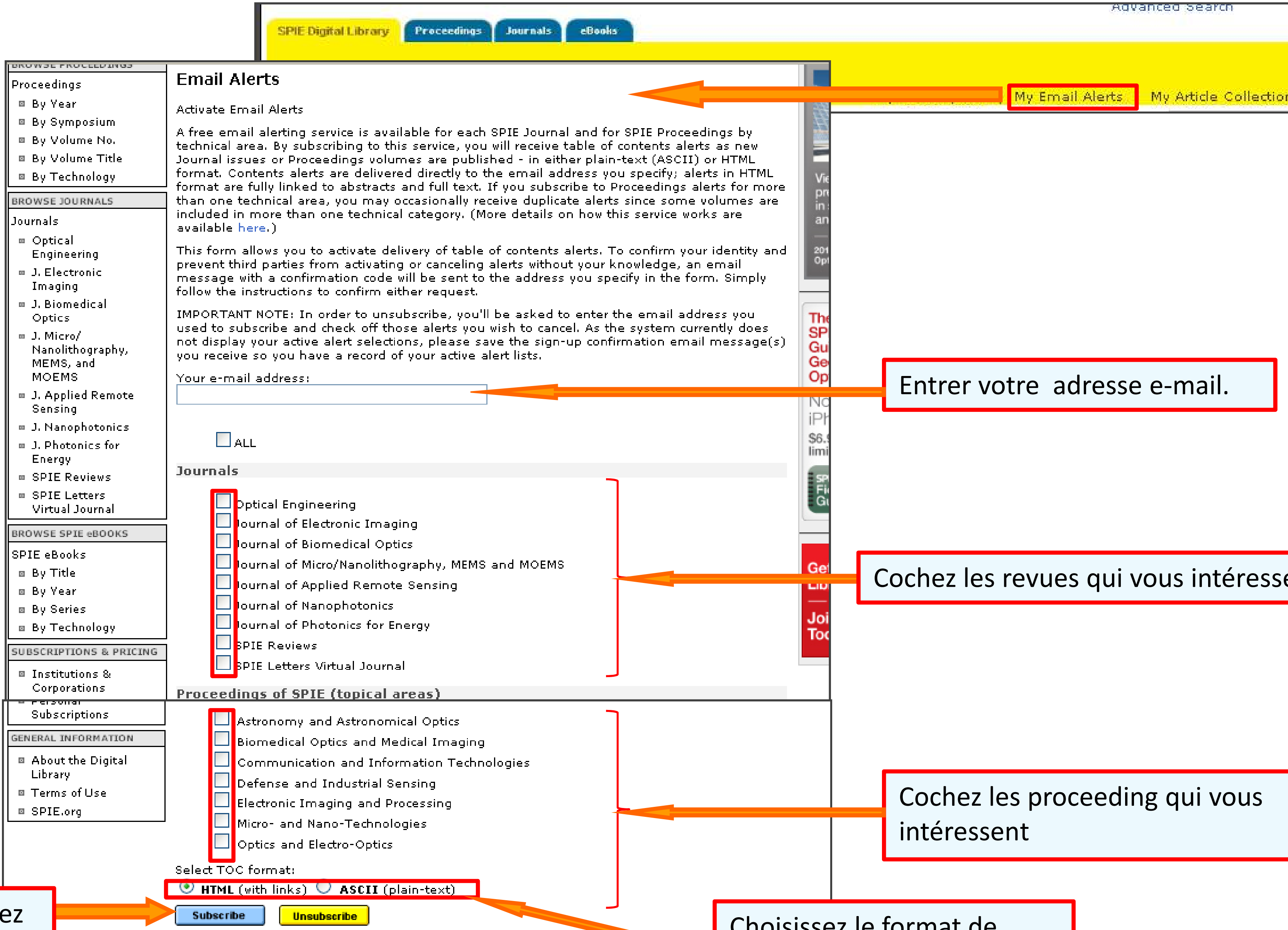

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