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## From the surface into the bulk: 3D fs-laser treatments of transparent materials

A. Bellucci<sup>1</sup>, E. Bolli<sup>1</sup>, M. Mastellone<sup>2</sup>, S. Orlando<sup>2\*</sup>,  
A. Orsini<sup>1,3</sup>, R. Salerno<sup>1,4</sup>, V. Valentini<sup>1</sup>, D.M. Trucchi<sup>1</sup>

1 CNR-ISM, DiaTHEMA Lab, U.O.S. Montelibretti, Via Salaria km 29.300,  
00015 Monterotondo, Italy

2 CNR-ISM, FemtoLAB, U.O.S. Tito Scalo, Zona Industriale, 85050 Tito, Italy

3 Università degli Studi Niccolò Cusano, "ATHENA" European University, via don Carlo Gnocchi 3,  
00166 Roma, Italy

4 Dipartimento di Scienze e Tecnologie Chimiche, Università degli Studi di Roma "Tor Vergata",  
Via della Ricerca Scientifica, 00133 Rome, Italy

\* Corresponding author e-mail: [stefano.orlando@cnr.it](mailto:stefano.orlando@cnr.it)

Laser surface treatments are popular in texturing not only for transparent materials but also, as example, for adhesion changing of metal surfaces or electrical conductivity variation in semiconductors.

In transparent materials it is also possible, for example, to create embedded paths of different refractive index inside the samples, in order to produce compact and efficient devices.

The main laser parameters which have been taken into account, to produce such embedded lines, are: repetition rate, pulse duration and energy, treatment (linear) velocity, and spot dimension.

The texturing activity may encounter some drawbacks related to the production of embedded lines inside the bulk of transparent materials.

Our work aims to understand the origin of these drawbacks and find an experimental solution to overcome them in order to produce, easily and effectively, devices useful in different application fields.