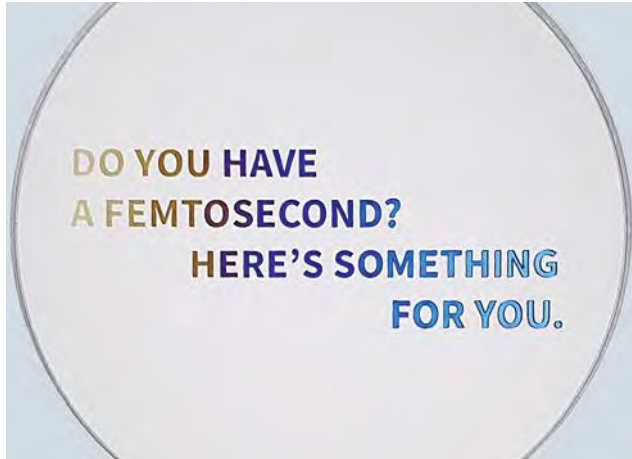


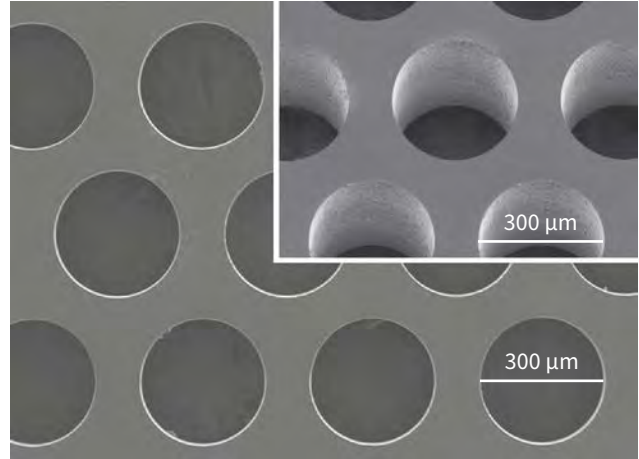
# Examples of Industrial Applications

## Birefringent volume modification in glass



Form induced birefringence-retardance variation results in different colors in parallel polarized light.  
Source: Workshop of Photonics.

## High precision glass drilling



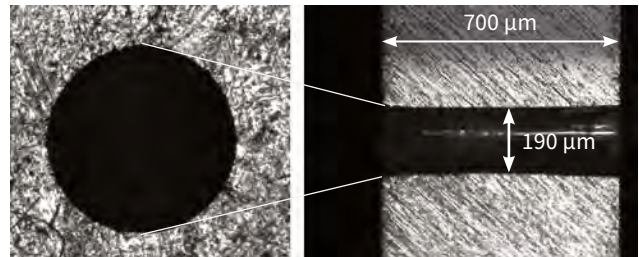
Various glass drilling.  
Source: Workshop of Photonics.

## Glass needle microdrilling



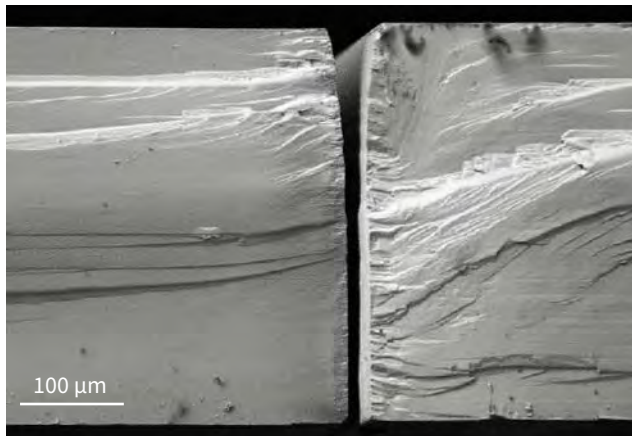
Glass needle microdrilling.  
Source: Workshop of Photonics.

## Steel drilling



Taperless hole microdrilling in stainless steel alloys.  
Source: Workshop of Photonics.

## Brittle & highly thermal-sensitive material cutting



Multi-pass cadmium tungstate cutting.  
No cracks. All thermal trace effects eliminated.  
Source: Micronanics Laser Solutions Centre.

## Stainless steel stent cutting



Stent cut using CARBIDE laser.  
Source: Amada Miyachi America.

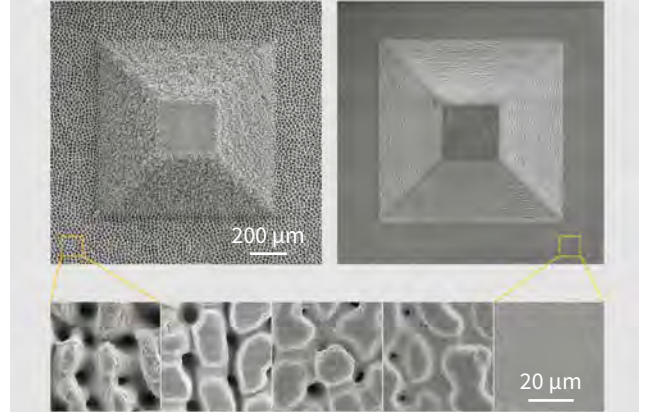
## Milling of complex 3D surfaces



3D milled sample in copper. Zoom in SEM image.

Source: "Highly-efficient laser ablation of copper by bursts of ultrashort tuneable (fs-ps) pulses", A.Žemaitis, P.Gečys, M.Barkauskas, G.Račiukaitis, M.Gedvilas. Scientific Reports (2019).

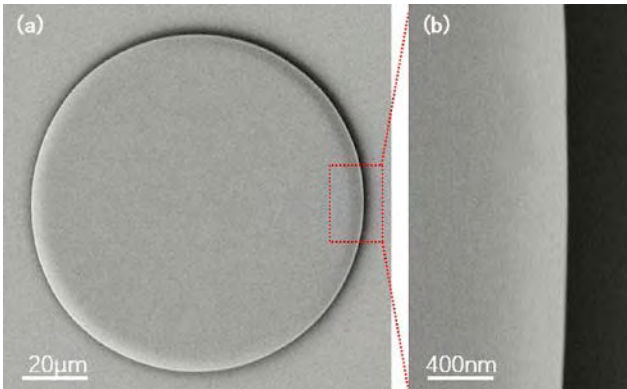
## Stainless steel polishing



SEM image collage of structures ablated in stainless steel, before and after laser polishing using GHz burst (from left to right).

Source: "High quality surface treatment using GHz burst mode with tunable ultrashort pulses", D.Metzner, P.Lickschat and S.Weißmantel. Applied Surface Science (2020).

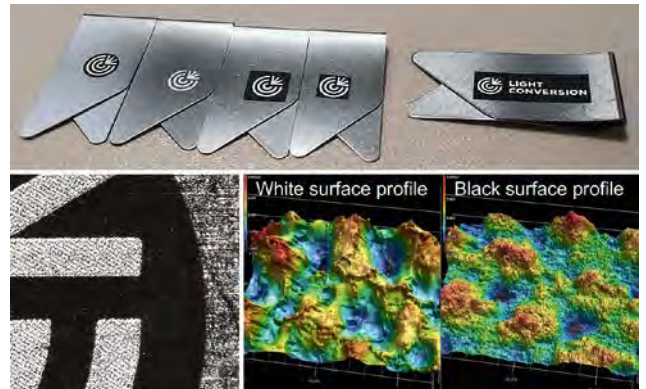
## Selective ablation



Lithium niobate microdisks fabricated using selective ablation.

Source: "Fabrication of crystalline microresonators of high quality factors with a controllable wedge angle on lithium niobate on insulator", J.Zhang, Z.Fang, J.Lin, J.Zhou, M.Wang, R.Wu, R.Gao, Y.Cheng. Nanomaterials (2019).

## High-contrast marking



High-contrast black-and-white marking on stainless steel clips using the BiBurst option.

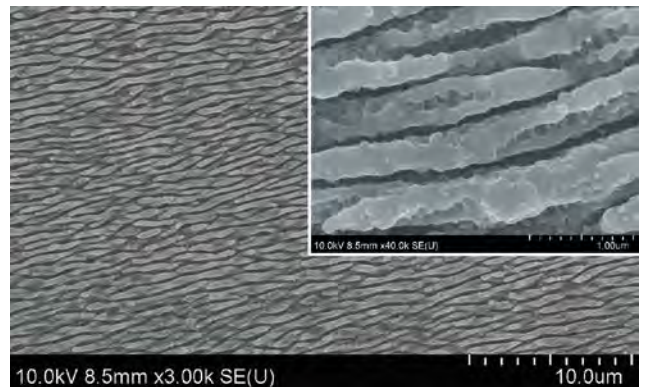
## Friction and wear reduction



Schematic of the laser treatment (a), laser patterning strategy (b), SEM image of induced LIPSS (c).

Source: "Tribological properties of high-speed uniform femtosecond laser patterning on stainless steel", I.Gnilitskiy, A.Rota, E.Gualtieri, S.Valeri, L.Orazi. Lubricants (2019).

## SERS sensor fabrication



SEM image of the Ti-6Al-4V (TC4) surface after irradiation with progressive laser scan.

Source: "Large-scale fabrication of nanostructure on bio-metallic substrate for surface enhanced Raman and fluorescence scattering", L.Lu, J.Zhang, L.Jiao, Y.Guan. Nanomaterials (2019).