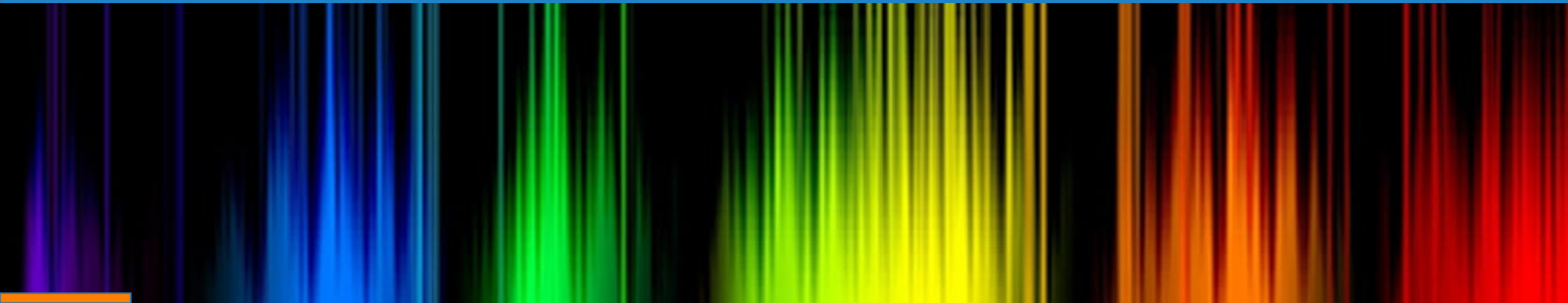


te lintelo systems bv
photonics. our passion!

How can photons unlock new possibilities for your application?



Welcome

- About TLS – Te Lintelo Systems
- What are photons?
- Generating photons (laser)
- Advantages of photons
- Example 1: Micro machining
- Example 2: German automotive industry
- Questions???



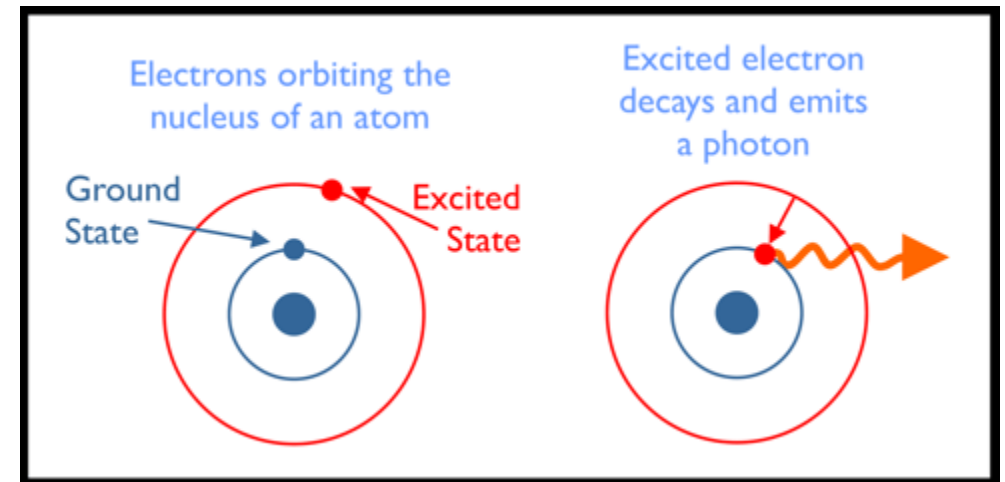
About TLS – Te Lintelo Systems

- Founded in 1985
- Located in Zevenaar (NL)
- Photonics supplier of:
 - Standard products
 - Custom products
 - OEM products
 - Laser sub systems
 - Customer specific solutions/sub systems



What are photons?

- Elementary particles of light.
- It behaves as both a particle and a wave.
- Massless, but has momentum.
- Moves at the speed of light.
- Its energy is directly proportional to its wavelength.



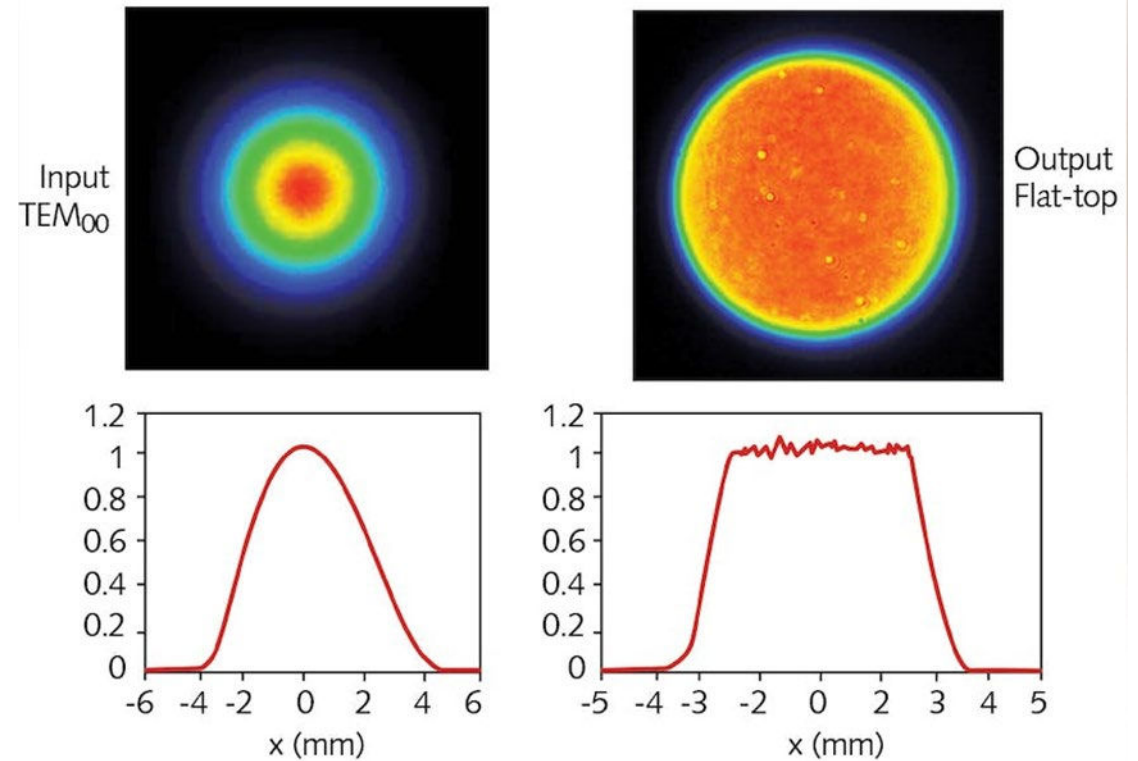
Generating photons (laser)

Light Amplification by Stimulated Emission of Radiation (LASER)

Highly controllable:

- Wavelength
- Pulse length
- Pulse shape
- Pulse energy
- Beam shape

Example of beam shaping for a TEM₀₀ laser



Generating photons (laser)

Pulse length

100 ns = 28m



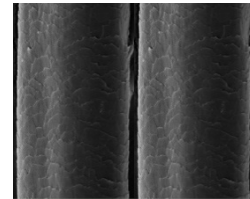
1 ns = 28cm



10 ps = 3mm



500 fs = 150µm

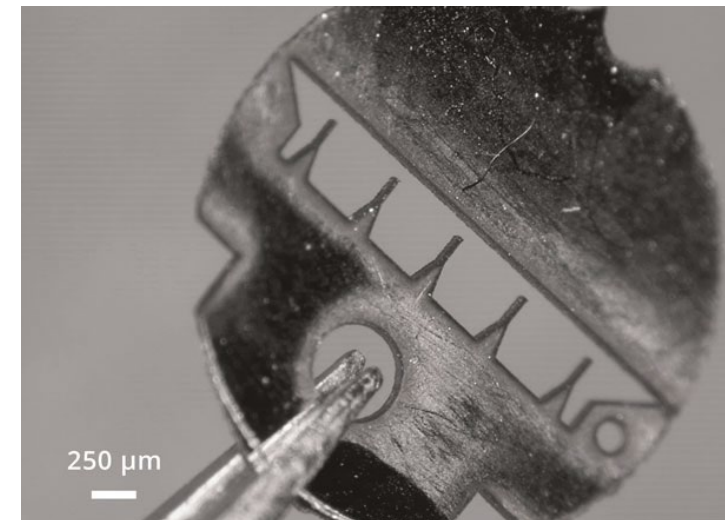
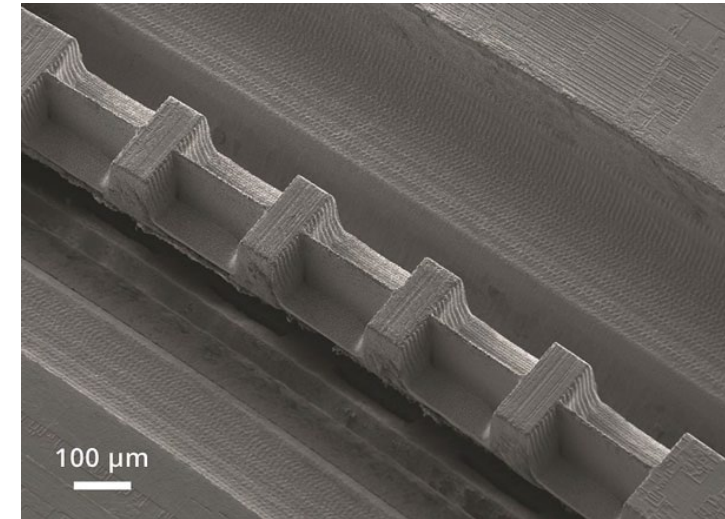
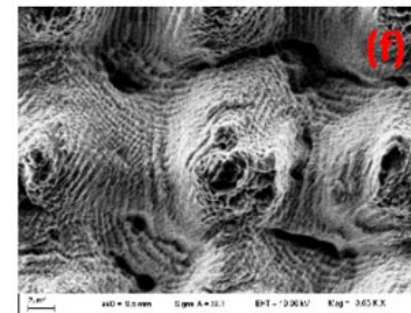
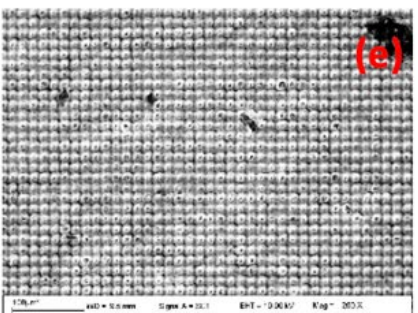
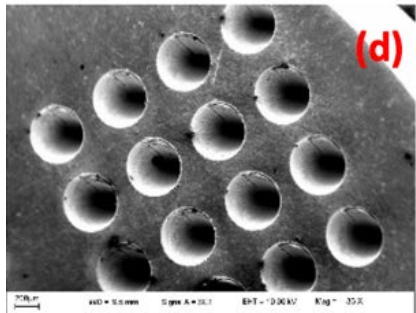
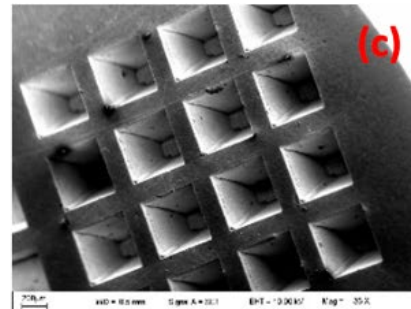
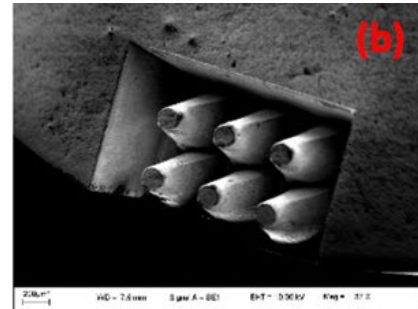
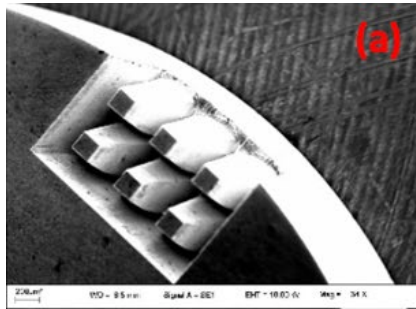


Advantages of photons over electrons?

- Faster
 - Moving at the speed of light
- Massless
 - Better energy efficiency
 - Lower heat production
 - Less cooling required
- Free space application
 - Transferrable through air



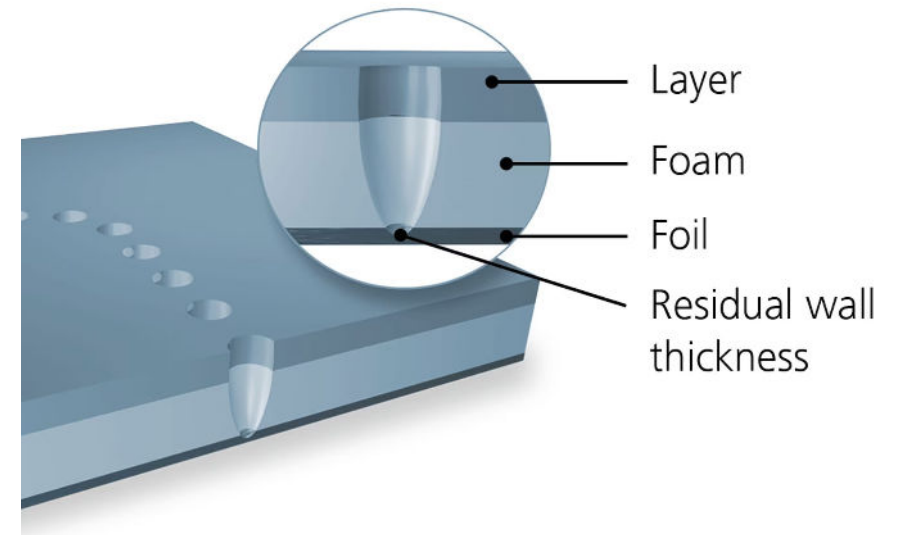
Example 1: Micro machining



- Using the pulse energy and very short pulse duration material can be ablated to engrave or create shapes.
- The ability to focus the spot size, of the beam to below 1 micrometer, allows small holes and shapes to be machined or cut in plastics and metals.

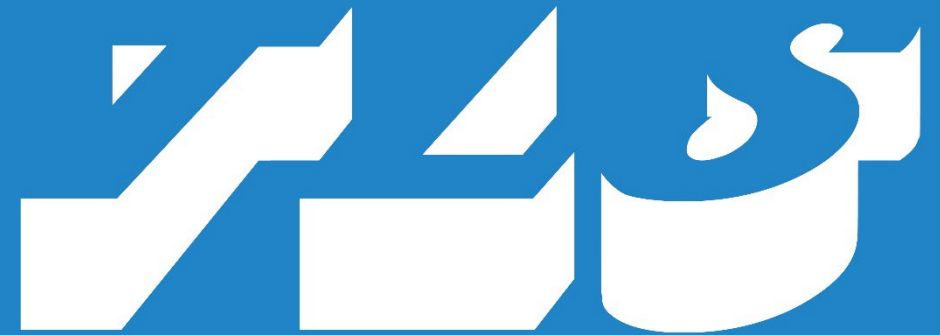
Example 2: Airbag tear lines

- Laser scoring process
 - Ablating micro holes from the back, to create tear line.
 - 100% control of conditions.
 - Minimal heat input, to prevent mechanical stress.
- Esthetics
 - Process has no influence on the interior design.
- Safety
 - Adjustable to airbag requirements, for best possible performance.
 - 100% inspection according to safety regulations.



Example 2: Airbag tear lines





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