

PRESS RELEASE

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-----**Structuring without masks**

New fabrication technique for periodically-poled lithium niobate

Periodically-poled lithium niobate (PPLN) is a nonlinear-optical crystal with specific photonic properties. It is suitable for example for the frequency conversion of laser light. Researchers at Fraunhofer IPM in collaboration with the University of Freiburg have developed a new technique that allows them to structure PPLN with full flexibility and without masks. They will present the new technique at the LASER World of Photonics trade fair in Munich.

Nowadays, there are many applications for laser light – both in measurement technology and analytics as well as for building quantum computers or atomic clocks. Depending on the application, very specific wavelengths are required. Often, no suitable laser is available. Here nonlinear-optical crystals such as periodically-poled lithium niobate (PPLN) then provide a way to generate the desired wavelength.

The problem: Until now, the established fabrication technique for PPLN crystals has been very inflexible and time-consuming. Any new poling-pattern requires the production of a specific photomask and exposure processes in a cleanroom. This is only worthwhile for the mass production of PPLN crystals if whole PPLN wafers should be processed within seconds. In addition, certain important patterns cannot be produced in this way.

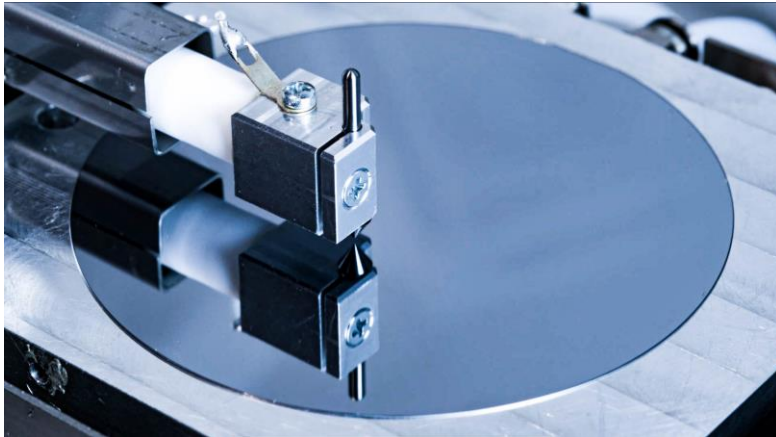
For small batches and special poling structures, however, the situation is quite different. Here the new maskless poling technique developed by Fraunhofer IPM and the University of Freiburg can show its advantages – as a cost-efficient alternative for specific requirements. The researchers write the desired poling-pattern directly into the material with the aid of a tungsten tip. The mask and the exposure step in the cleanroom are no longer necessary. Thanks to short turnaround times and great flexibility in the poling-pattern, even high quality one-of-a-kind production is no longer a problem.

Fraunhofer IPM will present the new technique at LASER World of Photonics 2023 in Munich (hall A2, booth 415). Further info at <https://www.ipm.fraunhofer.de/en/tradefairs-events/laser-wop-2023.html>

Editor

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Simply write: With Fraunhofer IPM's new technique it is possible to write poling-patterns in lithium niobate crystals with full flexibility; time-consuming mask fabrication is no longer necessary. © Fraunhofer IPM

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