Poster abstract
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Periodic engineered structures for biomedical and other applications by interfering laser beams[1]

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A variety of biological materials with hierarchical phase composites can be found. These biological materials successfully enhance cell growth and adhesion behavior on their surface. This behavior is in contrast to the situation with synthetic surfaces, where cells grow irregularly or die.
The interference pattern of coherent beams of a high power short pulse laser can be used for the creation of these biomimetic long-range ordered structures from nm to µm. Periodic structures with 10000 lines or 80 million dots can be created in parallel in a single processing step within a fraction of a second. These structures are not limited to topographic texturing, as known in the case of holographic gratings, but they can also create composite structures and phase transformations for directional cell growth, enhanced cell adhesion, or mechanical composite effects. This poster presents a brief overview of laser interference direct structuring and its capabilities for DARPA's Systems of Neuromorphic Adaptive Plastic Scalable Electronics (SyNAPSE) program.

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