Innoview

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Swissphotonics talk

Moirés by superposition of cylindrical microlens gratings

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Summary

Moiré principles
— Classical Moiré fringes

Categories of “shape” moirés
—1D and 2D Moirés, Level-line Moiré
— Design possibilities

Applications
— Rectilinear and spiral revealing layers
— Parallax with micro lenses
— Metallic deposition
— Lenslet extensions

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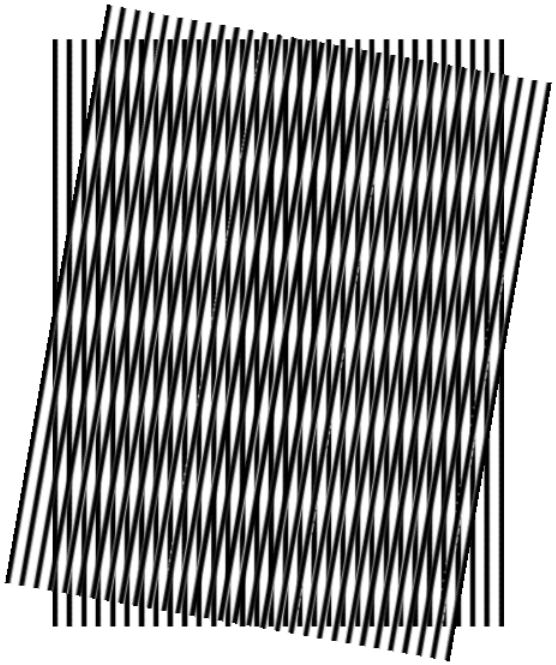
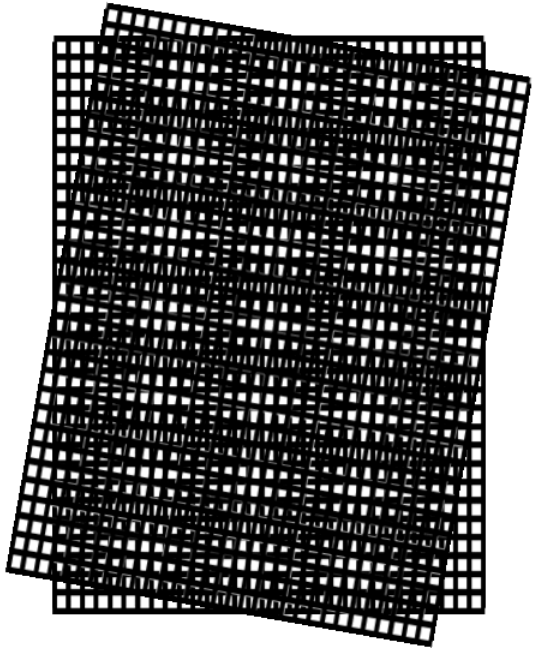
Classical Moiré fringes

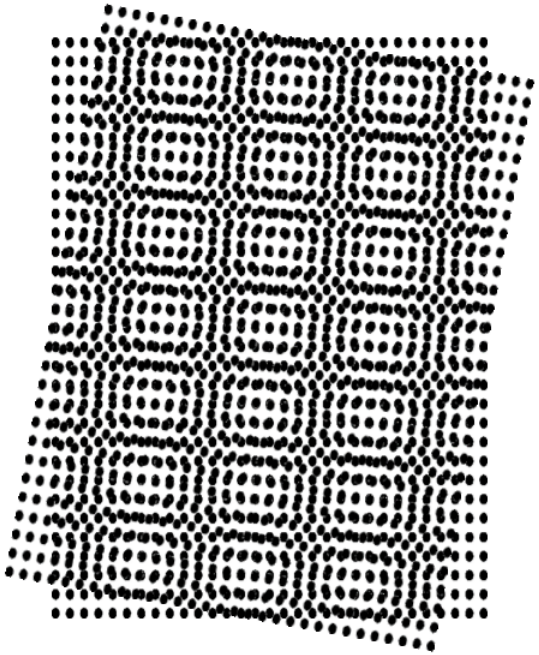
10 degrees



Line grating



Square grid



Dot screen

Period and orientation of the moiré

[Righi 1887], [Tollenaar 1945], [Bryngdahl 1974]

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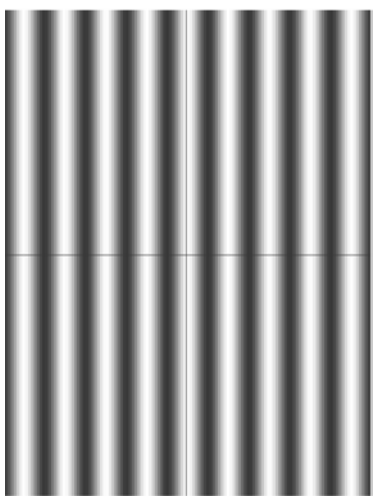
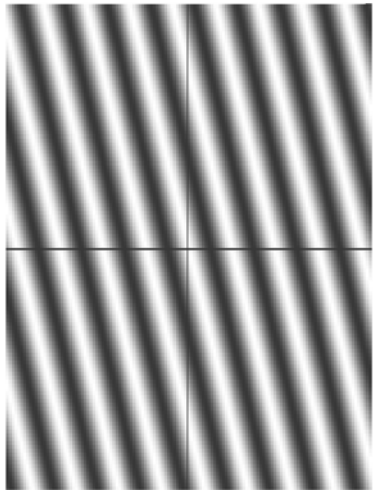
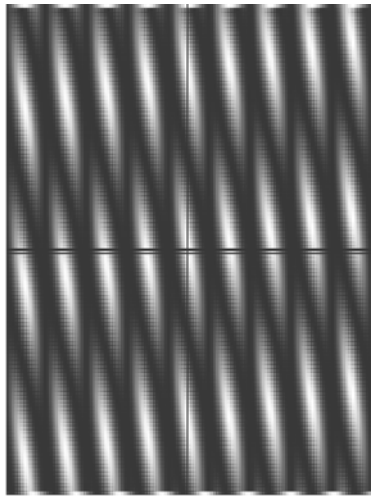
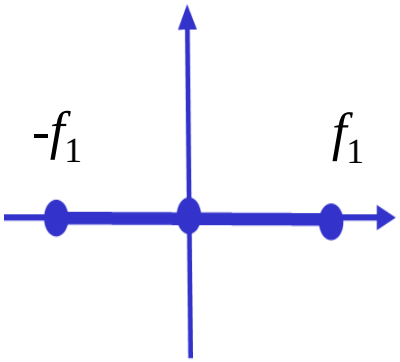
Moiré analysis

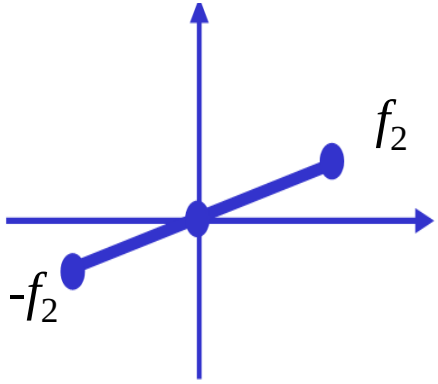
multiplication in image space ←→convolution in Fourier space

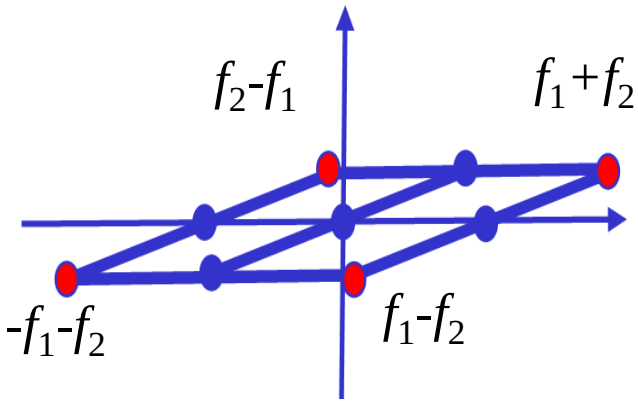












See book: The Theory of the Moiré Phenomenon, I. Amidror, Kluwer

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1D Moiré

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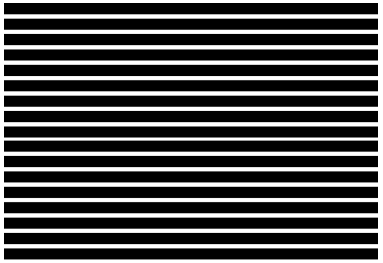
1D Moiré



Revealing layer

— Repeated 1D lines at a certain period

— Cylindrical micro lenses

Base layer

— Repeated structures at a different period

Animation

— Movement of the revealed shape (logo, text) **by displacing** the revealing layer on top of the base layer

— Aesthetic animations (rotation, spiral, radial)

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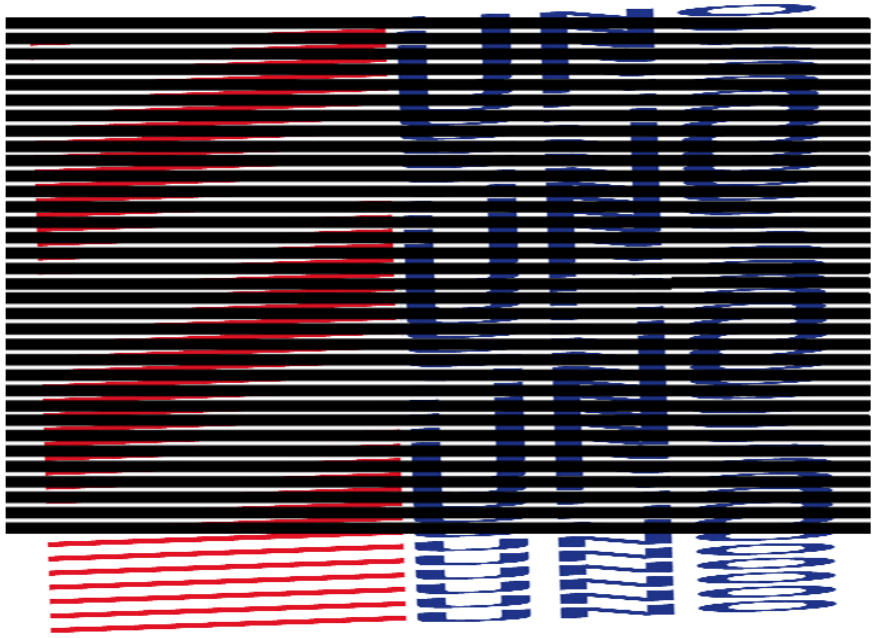
Sampling of the base layer



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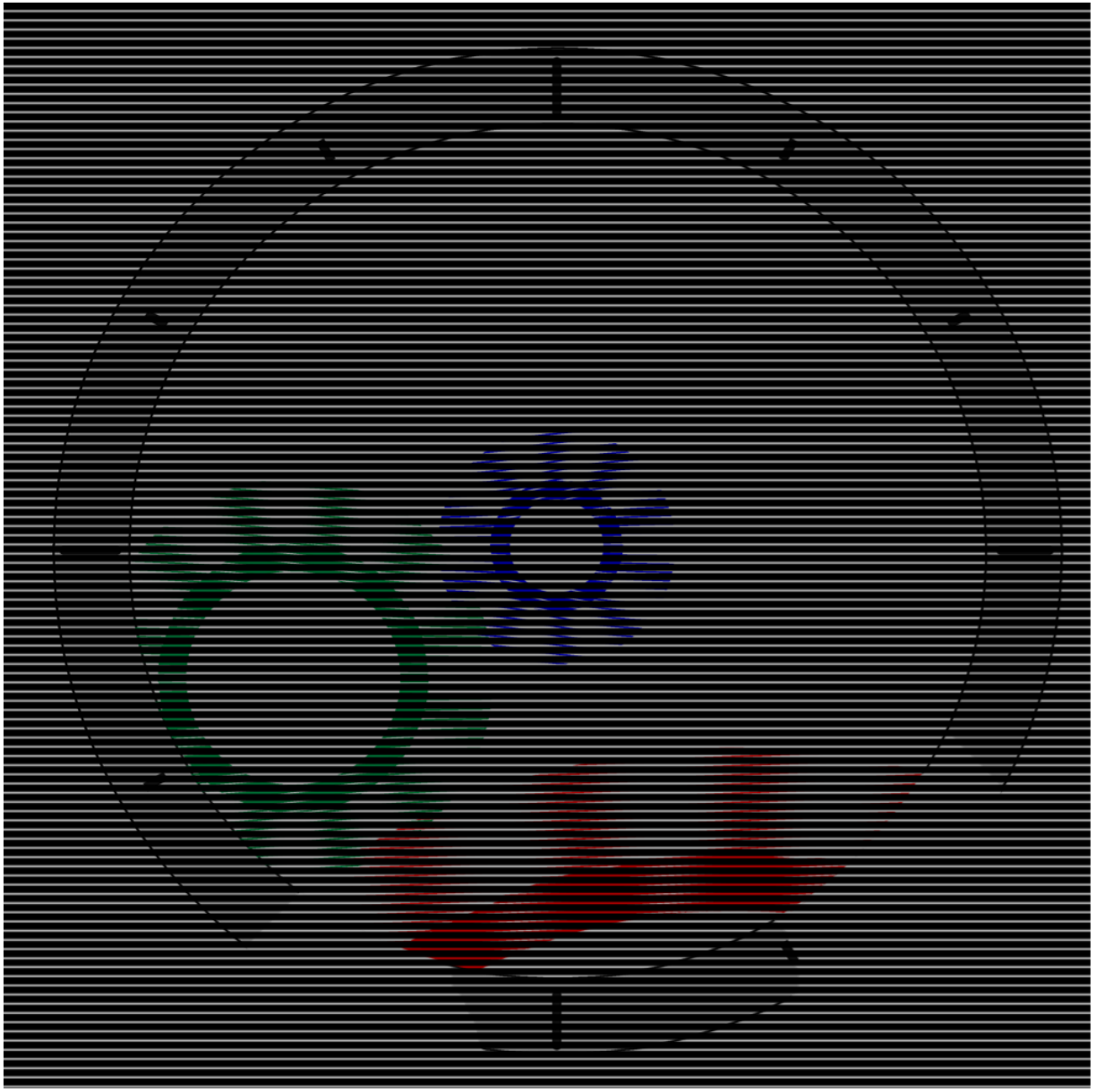
Base layer transformation: circle



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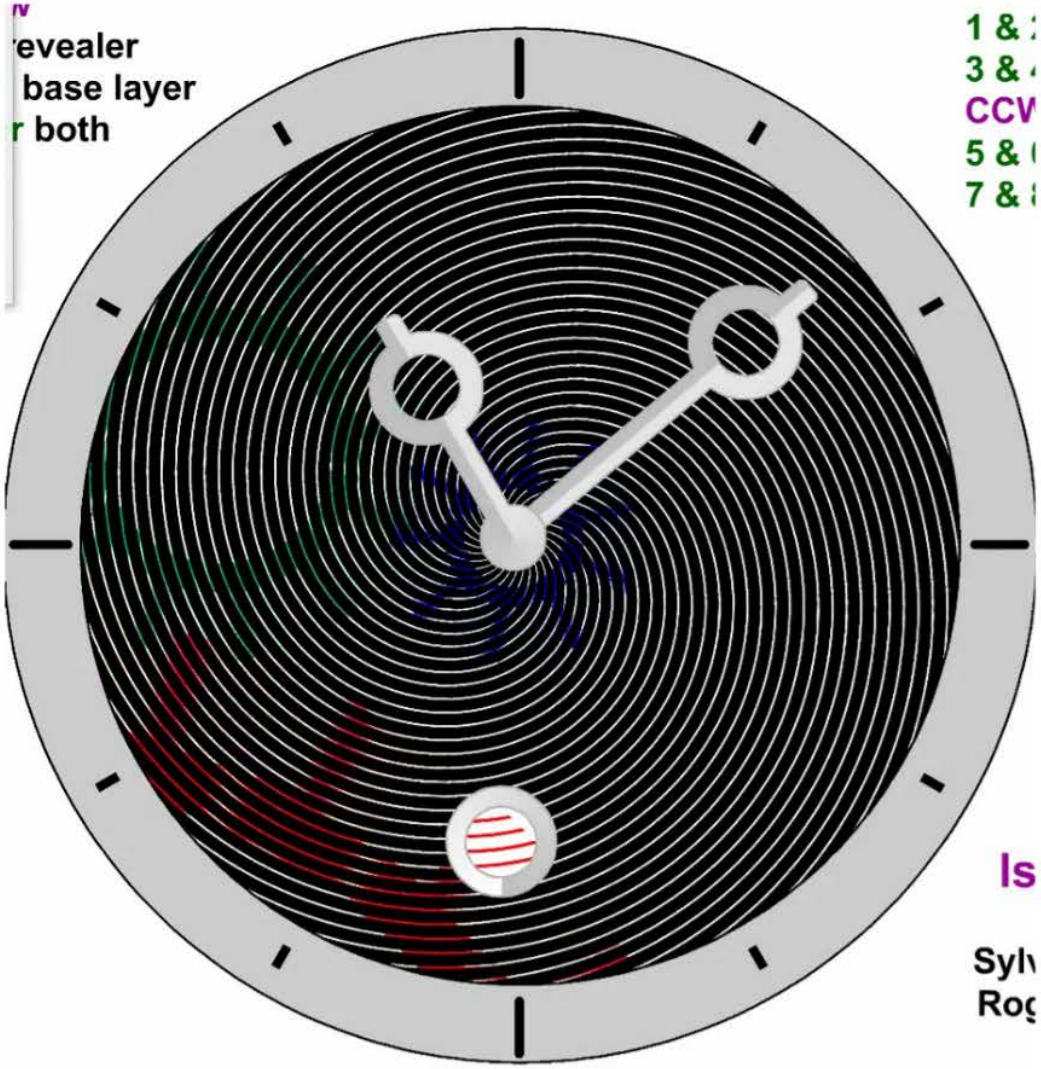
Spiral revealing layer



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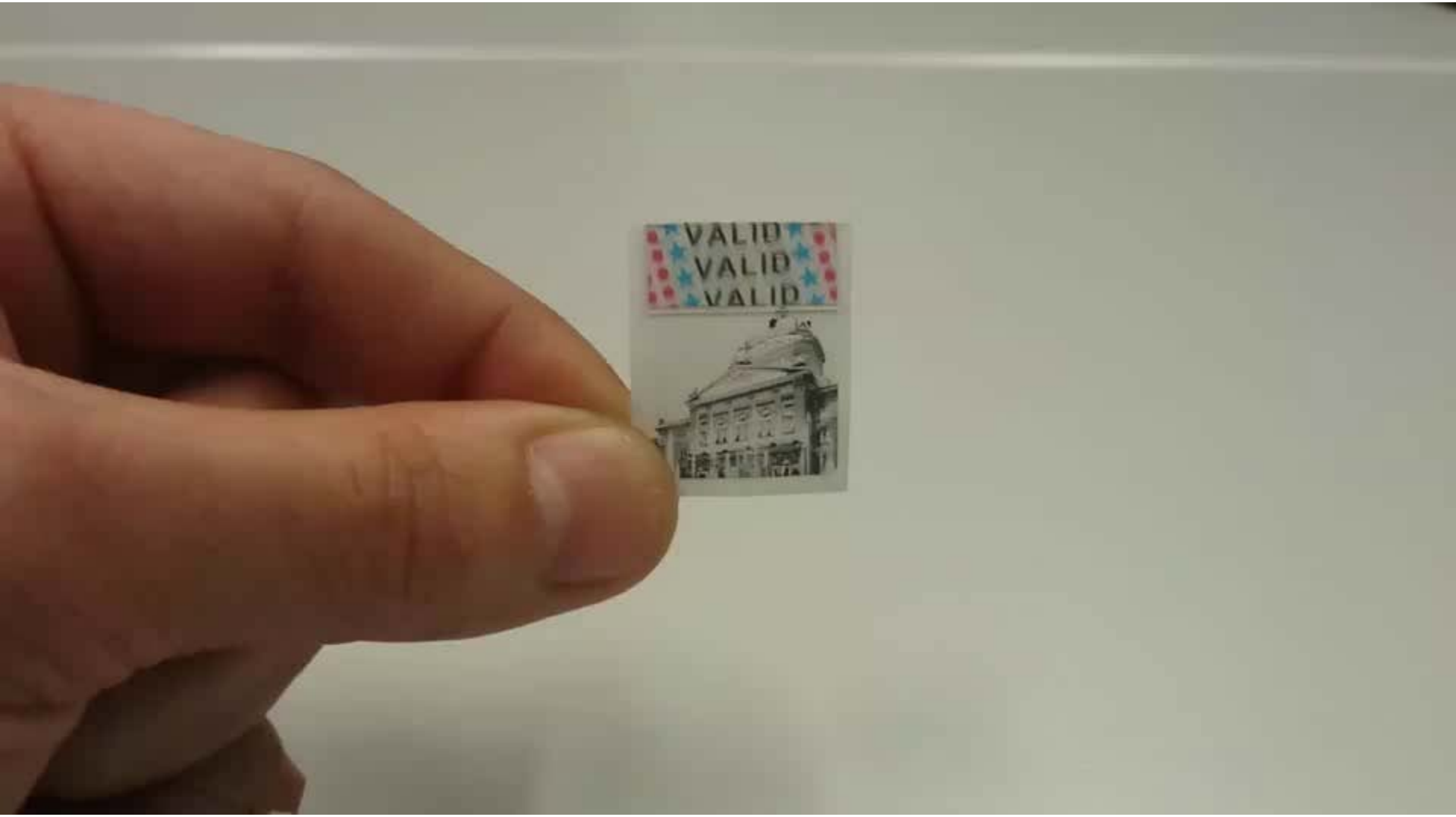
Parallax with micro lenses



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Lenslet: lenses on both sides

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2D Moiré

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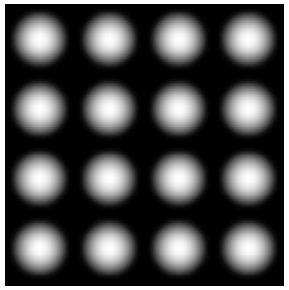
2D moiré: patterned metal base and spherical lenses revealer

Spherical lenses



Nominal lens diameter D=185 um

Viewing angle at 0 degree

Viewing angle at 10 degrees

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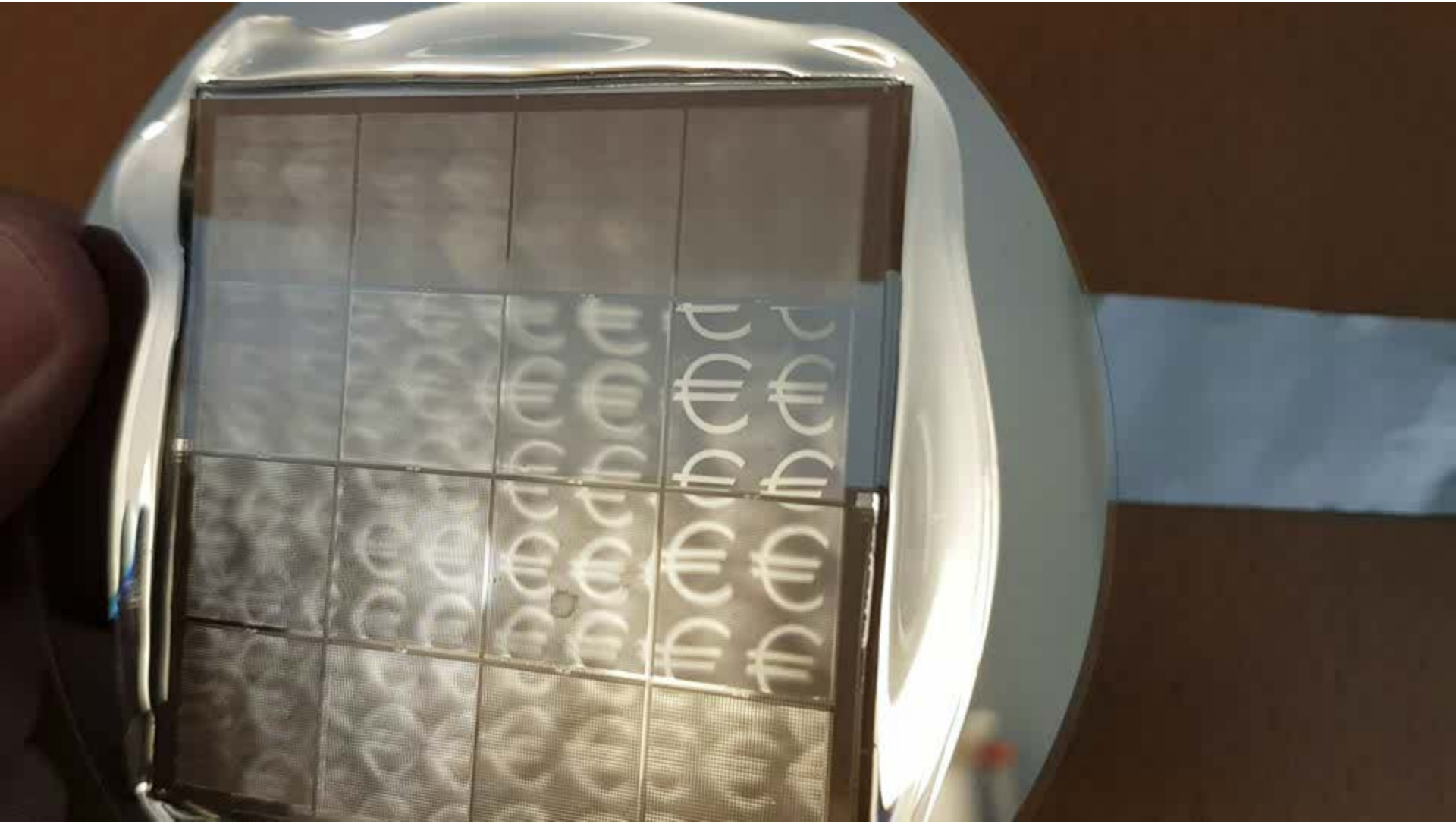
2D Moiré: metallic base and lenses



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Level-Line Moiré

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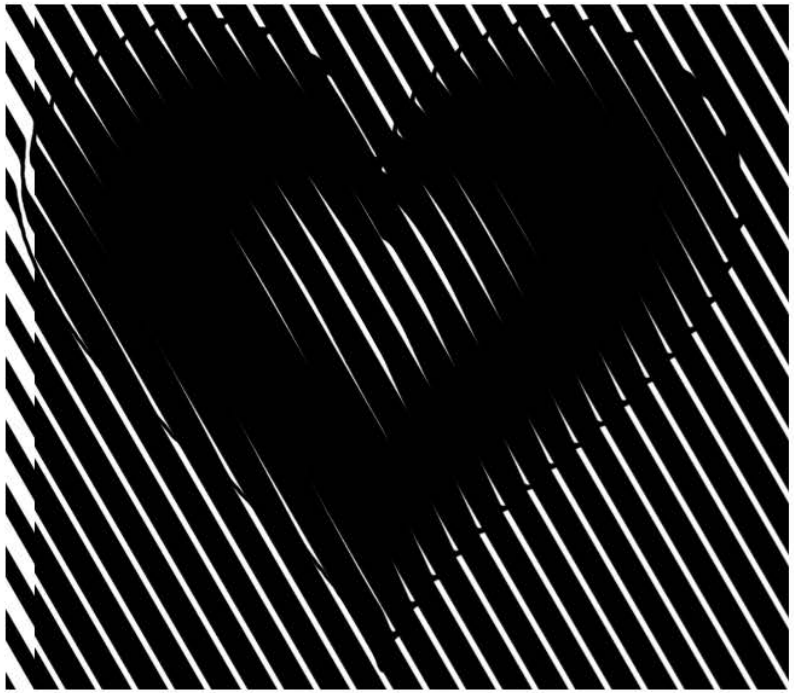
Level-line Moiré simple shape

Animation

— Shape is beating (not moving like 1D/2D Moirés)

Heart profile



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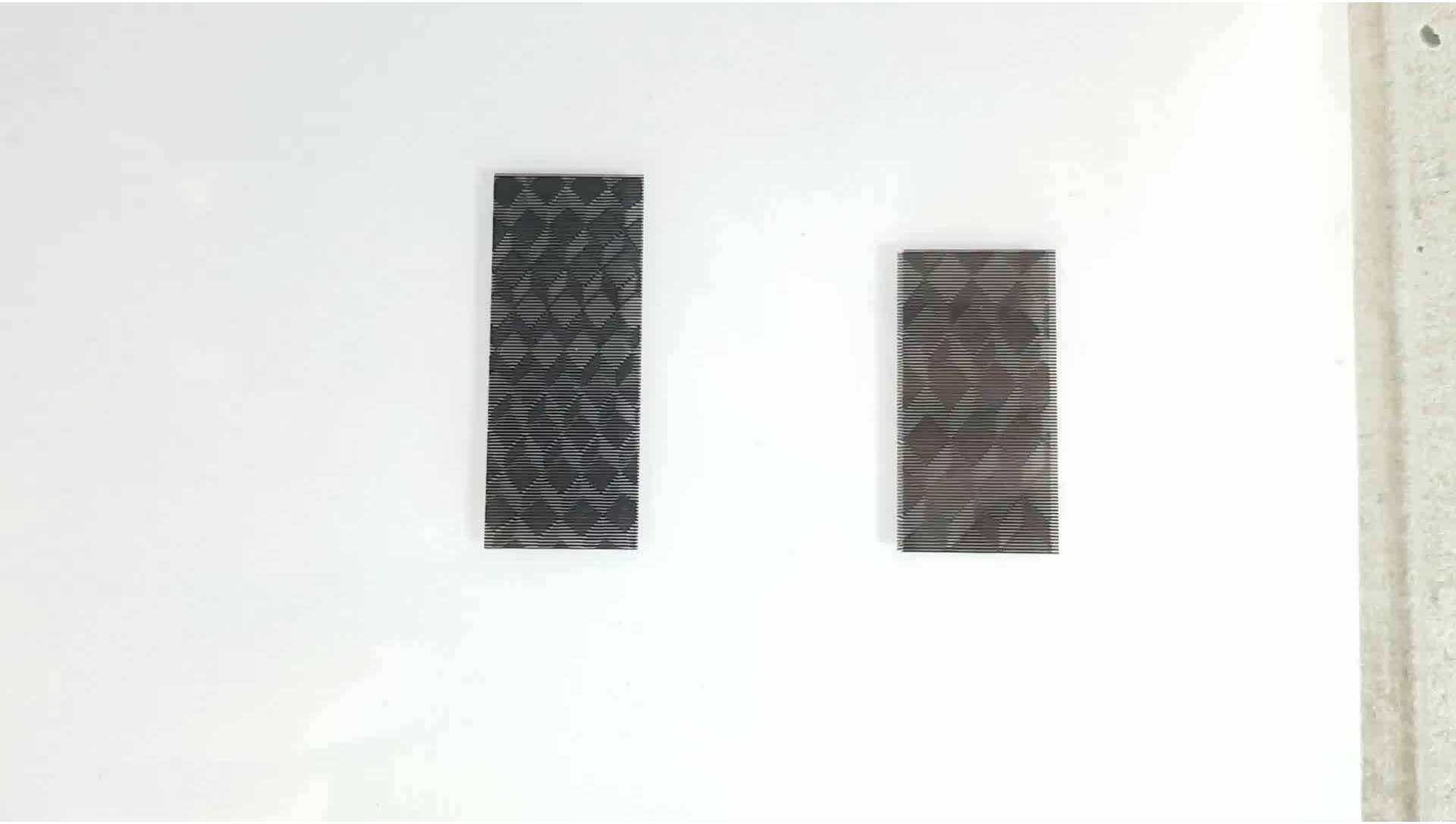
Parallax: distance between base and revealer



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Elevation profile of Michelangelo’s David

Lenslet: surface effect

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Processes of fabrication

Base and revealing layers

— Metallic deposition
— Laser engraving
— PVD process
— Transparent films
— Micro lenses

Animation

— Parallax with distance between base layer and revealer, e.g. 1mm
— Parallax with micro lenses

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