Infrared Ellipsometry

Chiral STFs

The symmetry of the nanostructures range allows immediate determination of chiral Aluminum wires

- Ion beam assisted deposition can be used to grow sculptured thin films composed of achiral and chiral Aluminum wires
- Mueller matrix mapping in the NIR spectral range allows immediate determination of symmetry of the nanostructures

Optical Properties of Sculptured Thin Films

New resonator structures

- New resonator structures might have tunable optical-mechanical resonances in the THz frequency domain
- New detector and source concepts
- New opto-mechanical sensor designs

New bio-molecular detectors

- Principle of functionalized chiral nano structure surfaces
- Chiral nano-structures functionalization by Surface hydroxilation, silanization, and peptide attachment

Glancing Angle Deposition of Aluminum Nanowires

Achiral STFs

- The incoming particle flux at glancing angle causes self-organized columnar growth due to shadowing and slow surface adatom movement

Vertical Aluminum screws are grown if the substrate is rotated during GLAD deposition.

Chiral STFs

- Substrate rotation around its normal during the deposition causes growth of nanospirals

Optical response of Aluminum Nanowires

NIR Mueller matrix mapping

Reciprocal difference:

Non-zero reciprocal difference ($M_{ij} = M_{ij}(p) + M_{ij}(p+q)$) hints to the existence of bi-anisotropic material properties and 3-fold symmetry of the STF.

Chiral STFs

- Mueller matrix map (azimuthal rotation $\varphi$ and angle of incidence scan $\alpha$) at $\lambda = 1500$ nm
- Anisotropic optical response: elements $M_{ij}$, $M_{ij}$, $M_{ij}$, $M_{ij}$, $M_{ij}$, $M_{ij}$ are not zero

Infrared Ellipsometry

Achievable frequencies by changing resonator parameters:

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<thead>
<tr>
<th>$\Delta f$ (THz)</th>
<th>$f_1$ (THz)</th>
<th>$f_2$ (THz)</th>
<th>$f_3$ (THz)</th>
<th>$f_4$ (THz)</th>
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