

UNIVERSITY OF ŽILINA

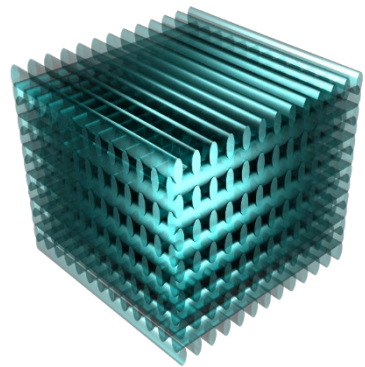
FACULTY OF ELECTRICAL ENGINEERING AND INFORMATION TECHNOLOGY

3D printing task

Topic: „Woodpile structure“

Goal:

The photonic crystals also known as photonic band-gap materials are a new type of materials in which the periodic dielectric structures with a band gap forbid propagation of a certain frequency range of light. This crucial optical property is used for spectral selectivity in different optical filters and mirrors. Structure with “woodpile” geometry has robust photonic band gap and very interesting optical properties. Moreover, light propagation in photonic crystals is depending on the direction, so the woodpile orientation can create different effects depending on the orientation. Recently, the woodpile structures have been used as invisibility cloak with the exotic capability of making objects invisible in desired directions. Another application used the woodpile structures as selective spectral filters in light emitting diodes and special diffractive structures with Laue diffraction.



The following sub tasks will be due:

- Research on woodpile structures and their applications in photonics
- Defining the functionality and physical requirements
- Creating a 3D model using CAD software (Autodesk Inventor, Blender, SolidWorks, ...)
- Selecting appropriate 3D printing methods and materials
- Printing and testing different geometrical parameters, measuring transmittance, reflectance and diffraction on woodpile structures

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