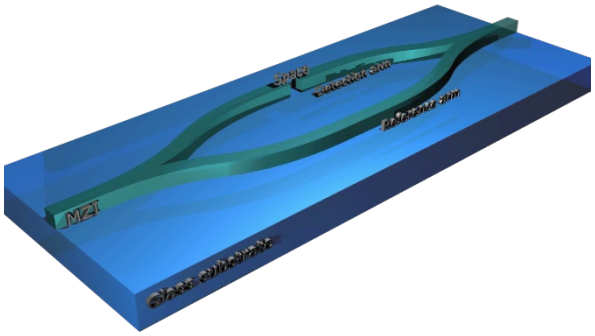
UNIVERSITY OF ŽILINA

FACULTY OF ELECTRICAL ENGINEERING AND INFORMATION TECHNOLOGY

3D printing task

Topic: **„On-chip Mach-Zehnder interferometer“**

Goal:



Photonic integrated circuits (PICs) represent a pioneering breakthrough in integrating multiple optical components on one chip. PICs create modern photonic sensoric platform with many of advantages and very compact design. Especially, **Mach-Zehnder interferometer** (MZI) is one of the plenty of the optical components, which can be integrated into the PIC platform. It consists of two arms creating two different optical paths for guiding light. So changing the geometrical or optical parameters of one arm will affect the interference spectral change. As the interference spectra is very sensitive on optical and geometrical parameters, the MZI creates very sensitive device with ease of integration on an optical chip. Also, there are many applications as the temperature sensor, liquid and gas sensor.

The following sub tasks will be due:

- Research on interference principle and function of Mach-Zehnder interferometer and its 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 morphology in confocal laser microscope and measuring spectral interference in transmittance spectrum

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