Optimization of 3D 1×4 Multimode Interference Splitter Based on Polymer Material Platform

Stanislava Serecunova[1,6 a)], Dana Seyringer[2], Dusan Pudis[3,4], Tomas Mizera[3], Frantisek Uherek[5, 6] and Heinz Seyringer[1, 2]

[1]*V-Research GmbH, Stadtstraße 33, 6850 Dornbirn, Austria*
[2]*Research Centre for Microtechnology, Vorarlberg University of Applied Sciences (FHV), Hochschulstraße 1, 6850 Dornbirn, Austria*
[3]*Department of Physics, FEIT UNIZA, Univerzitna 1, 010 26 Zilina, Slovakia*
[4]*University Science Park of the University of Zilina, Univerzitna 1, 010 26 Zilina, Slovakia*
[5]*International Laser Centre, Ilkovicova 3, 841 04 Bratislava, Slovakia*
[6]*Institute of Electronics and Photonics, FEI STU, Ilkovicova 3, 812 19 Bratislava, Slovakia*

[a)] *Corresponding author: stanislava.serecunova@v-research.at*

Abstract. This paper presents design, simulation, and optimization of the three-dimensional 1×4 optical multimode interference splitter using IP-Dip polymer as a core and polydimethylsiloxane (PDMS) Sylgard 184 as a cladding. The splitter was simulated by using beam propagation method in BeamPROP simulation engine of RSoft photonic tool and optimized for an operating wavelength of 1.55 μm. According to the minimum insertion loss, the dimensions of the MMI coupler and the length of the whole MMI splitter structure were optimized applying a waveguide with a core size of 4×4 μm^2. The objective of the study is to create a design for fabrication by three-dimensional direct laser writing optical lithography.