The generic photonic foundry perspective: existing foundries, manufacturing, access, expectations, philosophy

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The development of the manufacturing technology for complex optical chips is very expensive. The costs of a well-equipped chip factory add up to several hundred million euros and then you only have the equipment and the building. Also the development of the integration processes that involve a large number of lithography, deposition and etching steps costs seceral millions of euros. There are few markets large enough to justify such huge investments. In microelectronics this problem has been solved by the development of standardised technology in which a number of building blocks, such as transistors, resistors and capacitors, can be integrated in large numbers – billions of transistors per chip – in a single standardized manufacturing process. As a result of this the high investment costs can be earned back across a combined market that is much larger than the markets for the individual applications. To drastically reduce the high costs for the use of optical chips a similar development is underway in photonics. If you have a technology with which components for manipulating the amplitude, phase and polarisation of light can be integrated as basic building blocks, then you can realise chips with different functionalities in a single integration process. Such a technology is called a generic integration technology.

By providing open access to such a technology through generic foundries, the entry costs for developing PICs for a variety of applications are dramatically reduced: You do not need to build an expensive cleanroom, and you also do not have to develop an expensive integration process: both the cleanroom and the standardized process are available and their costs can be shared by many users. In the lecture the philosophy of the generic foundry approach will be explained and the capabilities of the existing InP-foundry platforms will be discussed.