Optical modeling based on locally adapted simulation techniques

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Advanced photonic systems combine optical elements of different length scales and different optical properties. These properties have a large impact on the efficiency and accuracy of modeling techniques that can be applied for the simulation of such systems. So, geometrical optics methods are well suited for lens modeling whereas rigorous methods as Finite Element methods are required for systems with scales close to the wavelength of light.

In this talk we present the concept of Unified Optical Modeling that is strongly based on domain decomposition ideas. It includes several aspects of optical simulation, one of them being the combination of different simulation techniques. We discuss how optical systems have to be decomposed into sub-problems that allow an efficient solution or make a solution feasible at all. In particular, the talk will adress how Finite Element methods can be integrated into this concept. Results using the optical simulation software VirtualLab(TM) (www.lighttrans.com) are presented.

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