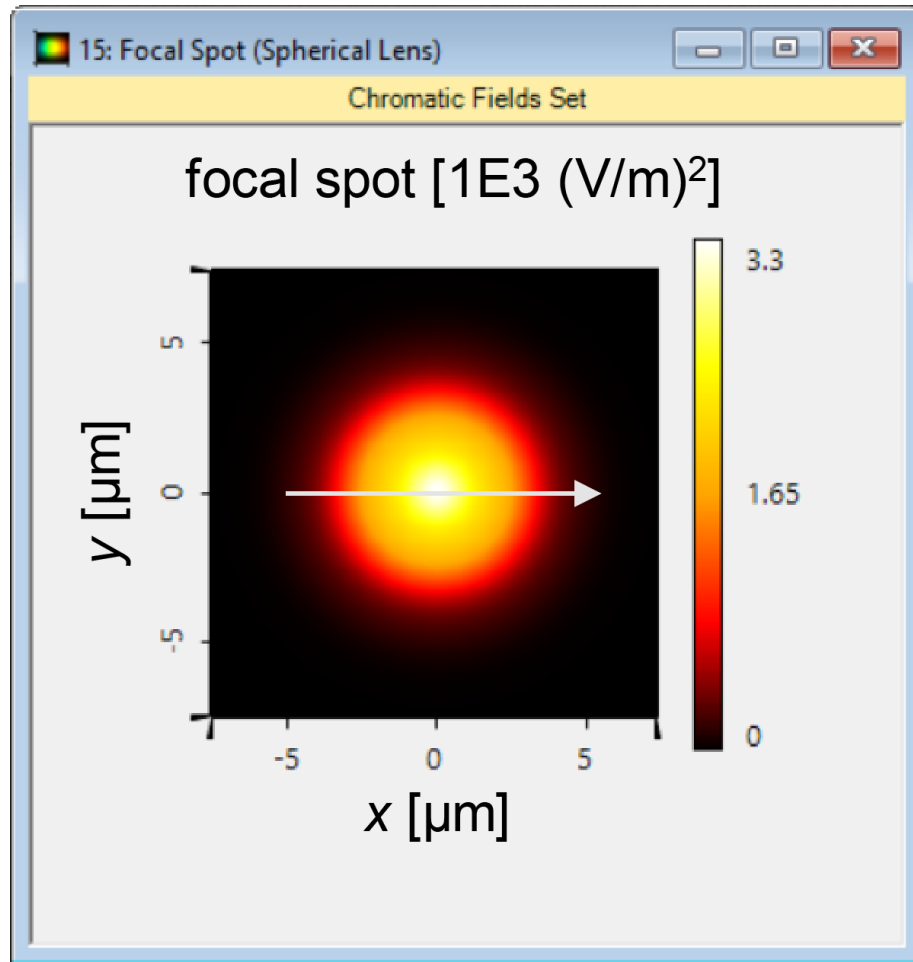


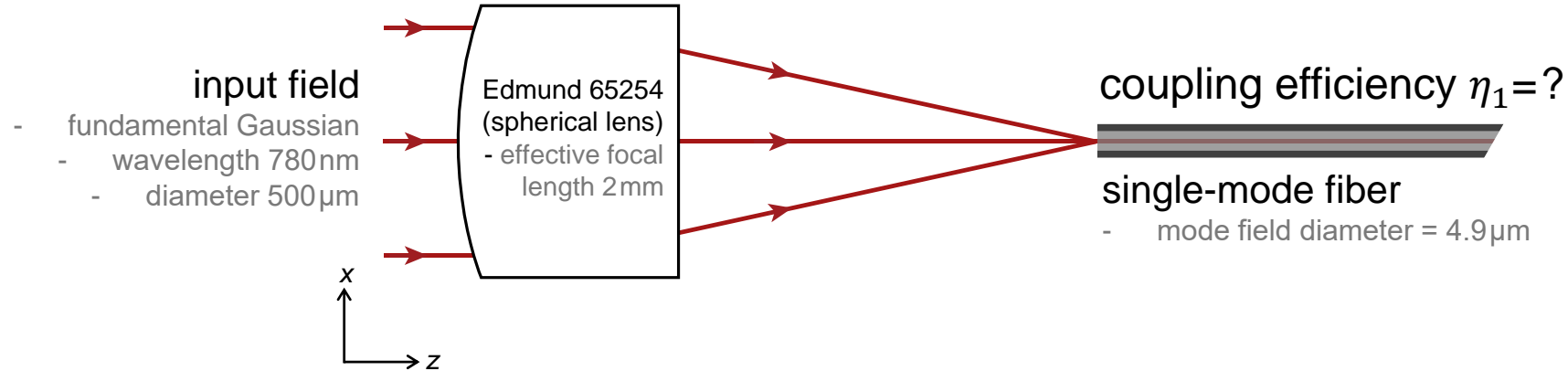
Comparison of Different Lenses for Fiber Coupling

Abstract

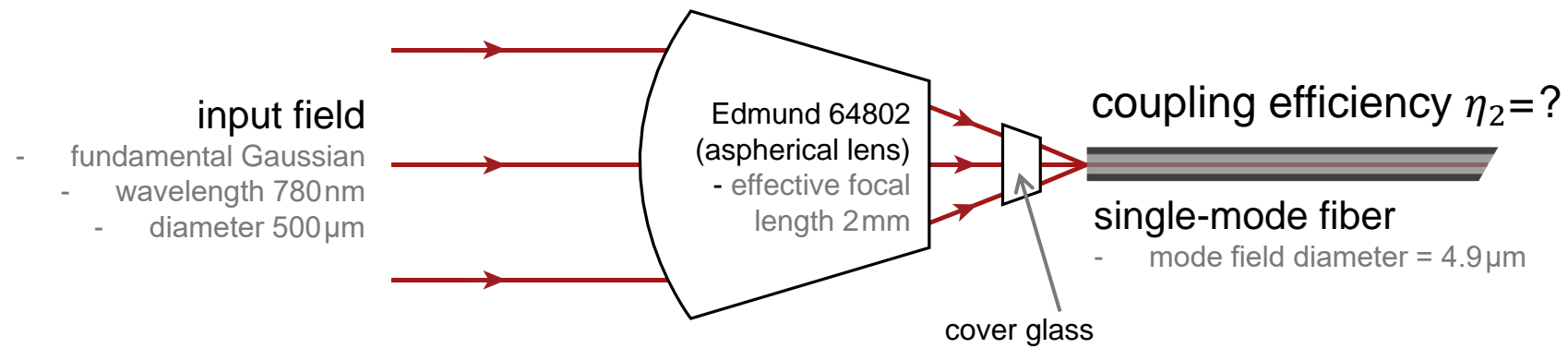


Optical fibers are widely used in different applications, and they play an important role in long-distance optical communication. In practice, launching light into optical fibers, especially to single-mode ones, can be a challenging task and the fiber coupling lens must be carefully chosen. In this example, we select two commercially available lenses, with the same effective focal length, but different surface types. They are evaluated, for the task of coupling light into a single-mode fiber, in terms of coupling efficiency which is calculated by using the overlap integral.

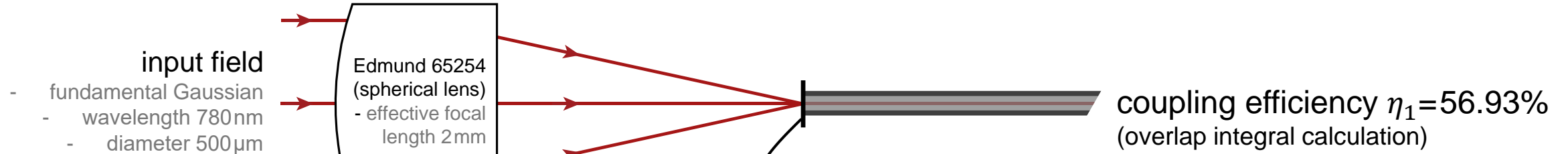
Modeling Task



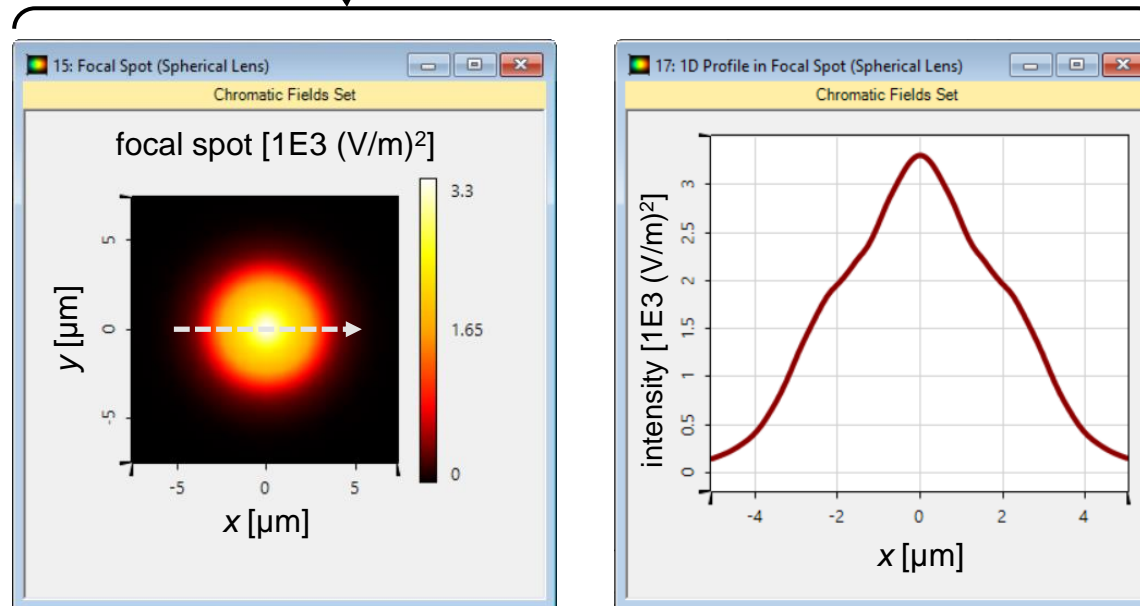
When two lenses with the same effective focal length are available for fiber coupling task, how to evaluate their performance in terms of coupling efficiency?



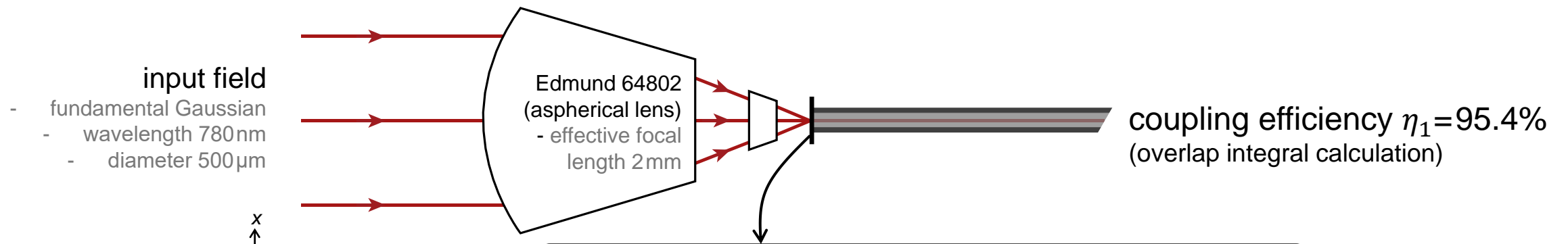
Simulation Results



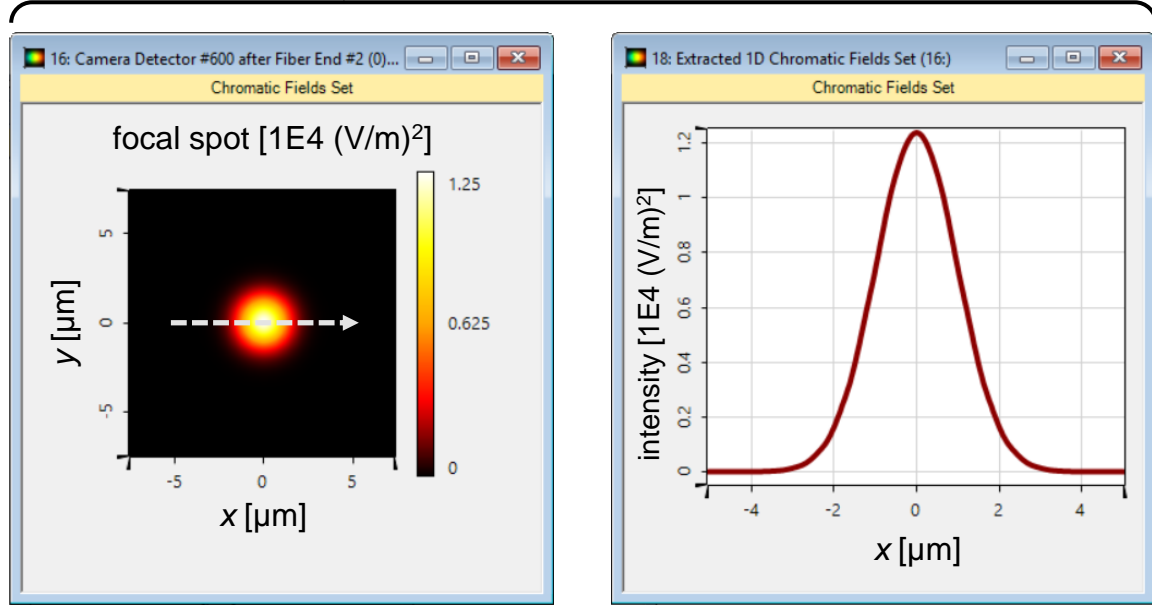
Due to aberrations from the spherical lens, the focal spot at the end of the fiber deviate from a Gaussian mode, and therefore it leads to poor coupling efficiency.



Simulation Results



Aspherical lens controls the aberrations well and that guarantees a focal spot in smaller size, and with Gaussian profile that fits to the fiber.



Document Information

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