Finally, note that the only the E_y field is shown because it is the dominant field component and contributes most heavily to the out-of-plane leakage [10]. Specifically, the E_y component dominates because the symmetry of the structure dictates that it will contain a non-zero DC component (central component in the light cone), unlike the E_x and E_z components.

6. Conclusion

In summary, by using a 2.5-dimension approximation, we demonstrate the inverse design of a three-dimensional nanophotonic resonator. Further development of our method includes applying our inverse method to design three-dimensional devices which support multiple fields at different frequencies. This includes resonant devices such as a multi-wavelength cavity, as well as waveguiding devices such as N-port couplers, multiplexers, and grating couplers.

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