

6. Conclusion

We have developed an all-optical intensity integrator based on multimode wave propagation inside a multimode waveguide. Since the integrator is based on modal dispersion, as opposed to chromatic dispersion, it is both wavelength- and bandwidth-independent, and offers great flexibility for ultra-fast real-time optical data processing. This integrator is simple and cost effective, eliminating the need for complicated optical filter design, optical spectral shaping and electro-optic modulation. We also demonstrated its applications in intensity integration of WDM signals and in real-time high-throughput optical phase reconstruction, with excellent agreement between theory and experiment.

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