

# Photonic energy lifters and event horizons with time-dependent dielectric structures

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**Abstract:** Time dependent dielectrics are intriguing environments not only for immediate applications, such as frequency shifting devices, sensors and switches, but also to investigate fundamental issues in quantum field theory, involving the generation of event horizons and Hawking radiation.

Novel photonic devices towards such goals can be conceived from two complementary principles, Doppler shift and time refraction, and possibly realized as single cavities or as Coupled Resonator Optical Waveguides (CROWs). Simulations with the finite-difference time-domain method bore out these possibilities and also provided design rules. Our preliminary experiments started at the University of California at Los Angeles will also be discussed.

## **Bio:**

Zeno Gaburro received his Laurea Degree in Electrical Engineering summa cum laude at Politecnico di Milano, Italy in 1992 and his Ph.D. in Electrical Engineering at the University of Illinois at Chicago in 1998. He is currently a faculty member at the Physics Department at University of Trento, Italy and a visiting professor at the School of Engineering and Applied Science at Harvard University. He has been chairing symposia for SPIE since 2002.

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