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Polaritonics: bridging the gap between electronics and photonics DAVID WARD, THOMAS FEURER, ERIC STATZ, JOUSHUA VAUGHAN, KEITH NELSON, Massachusetts Institute of Technology — Between electronics and photonics there exists a frequency gap of approximately 2 octaves, i.e. the frequency range between 100 GHz and 10 THz. Here we demonstrate that phonon-polaritons in ferroelectric crystals like LiNbO_3 or LiTaO_3 may be able to bridge this gap. The ability to fabricate structures within the crystal by femtosecond laser machining facilitates all integrated signal guiding and processing. Spatiotemporal imaging is employed for direct visualization of the electromagnetic field within the crystal. Polaritonic resonators, waveguides, photonic crystals and focusing, dispersive, and diffractive elements will be demonstrated.

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