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Title:Low-power inelastic light scattering at small detunings in silicon wire waveguides at telecom wavelengths
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Abstract:When a pump beam is propagating through a silicon nanophotonic waveguide, a very small fraction of the light is scattered to other frequencies. At very low intensity, the amount of scattered light is proportional to the power of the pump beam. We show that the scattering intensity increases linearly within the temperature range 300-575 K and that the photon flux decreases as the inverse of the frequency detuning ν over the investigated bandwidth 0.4 THz < |ν| < 2.5 THz. The simplest interpretation of these observations is that the pump beam is scattered on a one-dimensional thermal bath of excitations. Finally, the implications of this scattering process for quantum optics applications of silicon nanophotonic structures are discussed. © 2012 Optical Society of America.
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