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Title:Thermopile-based THz antenna

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Abstract: This work is intended to describe the design aspects and to characterize the functionality of a novel thermopile structure applicable for detecting millimetre range and THz radiation. The proposed thermopile consists of a series of micromachined poly-crystalline silicon thermocouple strips arranged linearly. This device can act as a series of antennas; its antenna-like operation was demonstrated clearly by the strong polarization dependence when detecting microwave radiation. The sensing principle is similar to the basic operation of bolometers in that the absorbed radiation heats up the semiconductor strips, but the temperature increment is detected by the Seebeck effect instead of the resistance change. Therefore there is no read-out current and the voltage output starts from zero. In the present work we are going to show the simulation of the current distribution. The fabrication of the device will also be outlined, as well as the results of measurements performed at 13, 100 GHz, and both in broad-band THz and in infrared radiation.

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