

# Novel Dual-Band Resonator Nanoantenna Array for Infrared Detection Applications

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We propose a novel dual-band resonator nanoantenna array based on fence-shaped nanoparticles for infrared detection applications. Here, we demonstrate that the proposed antenna has a dual-band spectral response, and the locations of these resonances can be adjusted by varying the geometrical dimensions. To enable further discussions on the physical origin of the dual-band resonance behavior of the structure, we determine the parameter dependence of this nanoparticle-based nanoantenna array. Furthermore, we analyze the field distributions of the structure at the corresponding resonance frequencies. Finally, we show the sensitivity of the resonant behavior to the refractive index and thickness of the dielectric load by embedding the structure in different cladding media. Owing to the dual-band spectral response and enhanced near-field distributions, the proposed resonator nanoantenna array with adjustable spectral responses can be useful for infrared detection applications.

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