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标题: Design of optical antenna for solar energy collection
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摘要: In this paper, an antenna array is designed in order to transform the thermal energy, provided by the Sun and re-emitted from the Earth, in electricity. The proposed antenna array is constituted by four square spirals of gold printed on a low cost dielectric substrate. A microstrip line, embedded into the substrate, is used to feed the array and to collect the thermal radiation. The dispersive behavior of gold at infrared frequencies has been taken into account through the Lorentz-Drude model. Simulations have been conducted in order to investigate the behavior of the antenna array illuminated by a circularly polarized plane wave with an amplitude chosen according to the Stefan-Boltzmann radiation law. An output current of about 3.8 mu A has been simulated at 28.3 THz, i.e. at the frequency of the Earth emitted radiation. Moreover, these infrared antennas could be coupled with other components to obtain direct rectification of infrared radiation. As a consequence, these structures further optimized could be a promising alternative to the conventional photovoltaic solar cells. 
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