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Title:Room temperature terahertz photodetection in atomic and quantum well realized structures

Authors:Zyaei, Majed (1); Rostami, A. (2); Haji Khanmohamadi, H. (1); Rasooli Saghai, H. (2)

Author affiliation:(1) Department of Electrical Engineering, Islamic Azad University, Ajabshir Branch, Ajabshir, Iran; (2) School of Emerging Engineering Technologies, University of Tabriz, Tabriz, Iran; (3) Departments of Computer Engineering, Islamic Azad University, Ajabshir Branch, Ajabshir, Iran

Corresponding author:Zyaei, M.(M_zyaei_sh@yahoo.com)

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Abstract:A novel kind of room temperature terahertz photodetector based on Electromagnetically Induced Transparency (EIT) is pre-sented. The main idea for room temperature and THz range operation is reduction of dark current which is done by converting of the incoming terahertz signal (long-wavelength Infrared signal) to short-wavelength field through EIT phenomena. For realization of this idea, we examine EIT phenomena in multi levels atomic system and quantum wells cascade structures. In the proposed structure the quantum interference between long wavelength and short-wavelength radiation modifies the absorption characteristic of short-wavelength probe field. By this means, the terahertz signal does not interact directly with ground state electrons, but affects on the absorption characteristics of the short-wavelength or visible probe optical field which directly interact with ground state electrons. Therefore, the important thermionic dark current in terahertz detection, can be strongly reduced. So, the proposed idea is appropriate for terahertz and room temperature applications.

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