Preecha P Yupapin, J Biosens Bioelectron 2014, 5:3
http://dx.doi.org/10.4172/2155-6210.S1.022

OMICS Group Conferences
Accelerating Scientific Discovery

3rd International Conference and Exhibition on
Biosensors & Bioelectronics
August 11-13, 2014 Hilton San Antonio Airport, San Antonio, USA

New type interferometer using rabi oscillation in a nonlinear ring circuit for atom/molecule sensing applications

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Rabi oscillation has been observed in many super-conducting devices, in which the quantum behavior between atom and electromagnetic field interaction is established. In this paper, an average two-level transient atom within an optical add-drop filter is used, which is consequently generated by the AlGaAs material interaction with electromagnetic field in time-domain, which is modeled by a two branch microring circuit. The simulation results obtained have shown that the coupling intensity is affected to the output intensity oscillation and also directly affected to the Rabi oscillation frequency. The atom probability in the excited state of the device with the decreasing oscillation frequency at resonance is also calculated, The Rabi oscillation frequency in the range of terahertz is obtained. The change in Rabi frequency can be introduced after the external coupling to the device coupling ports, which can be calculated and formed for sensing application. By using the change in frequency shifting and interference fringe counter, new type interferometer can be established, which is available for atom/molecule sensing applications. Such device can also be coated by material and formed as an atom/molecule antenna, which is useful for atom/molecule sensor, antenna and networks, which will be discussed in details.

Biography

Preecha P Yupapin received his PhD in electrical engineering in 1993 from City University, London and postdoctoral studies from European University Collaboration in 1994-1995. He is an Optical Society of America (OSA) advisory board member. He has published more than 350 papers in reputed journals and serving as an editorial board member of repute journals.

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