Electron Cloud Density Generated by Microring-Embedded Nano-grating System

Plasmonics

pp 1–7 | Cite as

- M. Bunruangses (1)
- P. Youplao (2)
- I. S. Amiri (3)
- N. Pornsuwancharoen (2)
- S. Punthawanunt (4)
- G. Singh (5)
- P. Yupapin (3) (6) Email author (preecha.yupapin@tdtu.edu.vn)View author's OrcID profile (View OrcID profile)

1. Department of Computer Engineering, Faculty of Industrial Education, Rajamangala University of Technology Phra Nakhon, , Bangkok, Thailand
2. Department of Electrical Engineering, Faculty of Industry and Technology, Rajamangala University of Technology Isan, , Sakon Nakhon, Thailand
3. Computational Optics Research Group, Advanced Institute of Materials Science, Ton Duc Thang University, , Ho Chi Minh City, Vietnam
4. Multidisciplinary Research Center, Faculty of Science and Technology, Kasem Bundit University, , Bangkok, Thailand
5. Department of ECE, Malaviya National Institute of Technology Jaipur (MNIT), , Jaipur, India
6. Faculty of Applied Sciences, Ton Duc Thang University, , Ho Chi Minh City, Vietnam

Article
First Online: 22 November 2019

Abstract

We propose the use of the electron cloud generated by quasi-particle waves called polariton dipoles, which oscillated within a silicon microring-embedded gold grating system for quantum consciousness processing model. An embedded gold grating is coupled by a whispering gallery mode beam generated by a soliton pulse, from which the polariton waves oscillated with the plasma frequency at the Bragg wavelength. The excited polariton cloud by the external stimuli can be detected at the system output ports. The two states of the polariton (electron) are spin-up and spin-down that can process automatically and deliver to the network and cloud. In manipulation, the results obtained show the electron density increased by increasing the input power into the system. In application, the cell polariton cloud coupled by the external stimuli and patterned by the

quantum cellular automata results, which localized in the cloud network and connected to the nerve cell access nodes. The coded polaritons connected to the nerve cell memory clouds, while the required commands are delivered to resonant cells via the network link. More stenographic codes can also be generated by other external stimuli sources, which can process similarly.

Keywords

Electron cloud source High-density qubits Quantum cellular automata Quantum signal processing

Notes

Acknowledgments

The authors would like to acknowledge the research facilities from Ton Duc Thang University, Vietnam, and the financial support from Rajamangala University of Technology Phra Nakhon, Bangkok 10200, Thailand.

Publisher's Note

References

1. Clarson SJ (2009) Charles Darwin and silicon. Silicon 1:59–63
CrossRef (https://doi.org/10.1007/s12633-009-9020-4)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Charles%20Darwin%20and%20silicon&author=SJ.%20Clarson&journal=Silicon&volume=1&pages=59-63&publication_year=2009)
2. Oldroyd DR (1986) Charles Darwin's theory of evolution: a review of our present understanding. Biol Philos 1(2):133–168
CrossRef (https://doi.org/10.1007/BF00142899)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Charles%20Darwin%E2%80%99s%20theory%20of%20evolution%3A%20a%20review%20of%20our%20present%20understanding&author=DR.%20Oldroyd&journal=Biol%20Philos&volume=1&issue=2&pages=133-168&publication_year=1986)
3. Schrodinger E (1967) What is life ? The physical aspect of the living cells & mind and matter. Cambridge University Press, London

Google Scholar (http://scholar.google.com/scholar_lookup?title=What%20is%20life%20%3F%20The%20physical%20aspect%20of%20the%20living%20cells%20%26%20mind%20and%20matter&author=E.%20Schrodinger&publication_year=1967)

4. Poznanski RR, Cacha LA, Latif AZA, Salleh SH, Ali J, Yupapin P, Tuszynski JA, Tengku MA (2019) Theorizing how the brain encodes consciousness based on negentropic entanglement. J Integr Neurosci 18(1):1–10
PubMed (http://www.ncbi.nlm.nih.gov/entrez/query.fcgi?cmd=Retrieve&db=PubMed&dopt=Abstract&list_uids=31091842)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Theorizing%20how%20the%20brain%20encodes%20consciousness%20based%20on%20negentropic%20entanglement&author=RR.%20Poznanski&author=LA.%20Cacha&author=AZA.%20Latif&author=SH.%20Salleh&author=J.%20Ali&author=P.%20Yupapin&author=JA.%20Tuszynski&author=MA.%20Tengku&journal=J%20Integr%20Neurosci&volume=18&issue=1&pages=1-10&publication_year=2019)

5. Poznanski RR et al (2017) Solitonic conduction of electrotonic signals in neuronal branchlets with polarized microstructure. Sci Rep 7:2746
CrossRef (https://doi.org/10.1038/s41598-017-01849-3)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Solitonic%20conduction%20of%20electrotonic%20signals%20in%20neuronal%20branchlets%20with%20polarized%20microstructure&author=RR.%20Poznanski&journal=Sci%20Rep&volume=7&pages=2746&publication_year=2017)

6. Bohm DJ (1952) A suggested interpretation of the quantum theory in terms of hidden variables. Phys Rev 85:166–193
CrossRef (https://doi.org/10.1103/PhysRev.85.166)
Google Scholar (http://scholar.google.com/scholar_lookup?title=A%20suggested%20interpretation%20of%20the%20quantum%20theory%20in%20terms%20of%20hidden%20variables&author=DJ.%20Bohm&journal=Phys%20Rev&volume=85&pages=166-193&publication_year=1952)

7. Bohm DJ (1990) A new theory of the relationship of mind and matter. Philos Psychol 3:271–286
CrossRef (https://doi.org/10.1080/09515089008573004)
Google Scholar (http://scholar.google.com/scholar_lookup?title=A%20new%20theory%20of%20the%20relationship%20of%20mind%20and%20matter&author=DJ.%20Bohm&journal=Philos%20Psychol&volume=3&pages=271-286&publication_year=1990)

8. Robert LO et al (2012) Optical dielectric function of gold, Physical review, 2012. B 86(235147):1–9
Google Scholar (http://scholar.google.com/scholar_lookup?title=Optical%20dielectric%20function%20of%20gold%2C%20Physical%20review%2C%202012&author=LO.%20Robert&journal=B&volume=86&issue=235147&pages=1-9&publication_year=2012)

9. Derkachova A, Kolwas K (2007) Size dependence of multipolar plasmon resonance frequencies and damping rates in simple metal spherical nanoparticles. Eur Phys J-Spec Top 144:93–99
CrossRef (https://doi.org/10.1140/epjst/e2007-00112-1)

Google Scholar (http://scholar.google.com/scholar_lookup?title=Size%20dependence%20of%20multipolar%20plasmon%20resonance%20frequencies%20and%20damping%20rates%20in%20simple%20metal%20spherical%20nanoparticles&author=A.%20Derkachova&author=K.%20Kolwas&journal=Eur%20Phys%20J-Spec%20Top&volume=144&pages=93-99&publication_year=2007)

10. Tunsiri S et al. (2019) Microring switching control using plasmonic ring resonator circuits for super-channel use, Plasmonics, First online 22: 1-9.
Google Scholar (https://scholar.google.com/scholar?q=Tunsiri%20S%20et%20al.%20%282019%29%20Microring%20switching%20control%20using%20plasmonic%20ring%20resonator%20circuits%20for%20super-channel%20use%2C%20Plasmonics%2C%20First%20online%2022%3A%201-9.)

11. Awschalom DD et al (2018) Quantum technologies with optically interfaced solid-state spins. Nature Photonics 12:516–527
CrossRef (https://doi.org/10.1038/s41566-018-0232-2)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Quantum%20technologies%20with%20optically%20interfaced%20solid-state%20spins&author=DD.%20Awschalom&journal=Nature%20Photonics&volume=12&pages=516-527&publication_year=2018)

12. Herold M et al. (2015) Cellular-automation decodeers for topological quantum memories, NPJ Quantum Information: 1; Article number 15210
Google Scholar (https://scholar.google.com/scholar?q=Herold%20M%20et%20al.%20%282015%29%20Cellular-automation%20decodeers%20for%20topological%20quantum%20memories%2C%20NPJ%20Quantum%20Information%3A%201%3B%20Article%20number%2015210)

13. Gács P (2001) Reliable cellular automata with self-organization. J Stat Phys **103**:45–267
CrossRef (https://doi.org/10.1023/A%3A1004823720305)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Reliable%20cellular%20automata%20with%20self-organization&author=P.%20G%C3%A1cs&journal=J%20Stat%20Phys&volume=103&pages=45-267&publication_year=2001)

14. Aizatsky NI et al (2016) Generation and formation of axially symmetrical tubular electron beam in a cold metal secondary-emission cathode magnetron gun-part II: Computer modeling. IEEE Transaction on Electron Devices 63(4):1710–1714
CrossRef (https://doi.org/10.1109/TED.2016.2523342)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Generation%20and%20formation%20of%20axially%20symmetrical%20tubular%20electron%20beam%20in%20a%20cold%20metal%20secondary-emission%20cathode%20magnetron%20gun-part%20II%3A%20Computer%20modeling&author=NI.%20Aizatsky&journal=IEEE%20Transaction%20on%20Electron%20Devices&volume=63&issue=4&pages=1710-1714&publication_year=2016)

15. Ali J et al (2018) Characteristics of an on-chip polariton successively filtered circuit. Results in Physics 11:410–413
CrossRef (https://doi.org/10.1016/j.rinp.2018.09.021)

Google Scholar (http://scholar.google.com/scholar_lookup?title=Characteristics%20of%20an%20on-chip%20polariton%20successively%20filtered%20circuit&author=J.%20Ali&journal=Results%20in%20Physics&volume=11&pages=410-413&publication_year=2018)

16. Bunruangses M et al (2019) Brain sensor and communication model using plasmonic microring antenna network. Opt Quant Electron 51:349
CrossRef (https://doi.org/10.1007/s11082-019-2074-7)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Brain%20sensor%20and%20communication%20model%20using%20plasmonic%20microring%20antenna%20network&author=M.%20Bunruangses&journal=Opt%20Quant%20Electron&volume=51&pages=349&publication_year=2019)

17. Bunruangses M et al (2019) Microring distributed sensors using space-time function control. IEEE Sensors J:1–1.
https://doi.org/10.1109/JSEN.2019.2945772 (https://doi.org/10.1109/JSEN.2019.2945772)

18. Agrawal GP (2011) Nonlinear fiber optics: its history and recent progress, [Invited]. J Opt Soc Am B 28(12):A1-A10
CrossRef (https://doi.org/10.1364/JOSAB.28.0000A1)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Nonlinear%20fiber%20optics%3A%20its%20history%20and%20recent%20progress%2C%20%5BInvited%5D&author=GP.%20Agrawal&journal=J%20Opt%20Soc%20Am%20B&volume=28&issue=12&pages=A1-A10&publication_year=2011)

19. Phatharaworamet T et al (2010) Random binary code generation using dark-bright soliton conversion control within a panda ring resonator. IEEE Lightwave Technol 28(19):2804–2809
CrossRef (https://doi.org/10.1109/JLT.2010.2062488)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Random%20binary%20code%20generation%20using%20dark-bright%20soliton%20conversion%20control%20within%20a%20panda%20ring%20resonator&author=T.%20Phatharaworamet&journal=IEEE%20Lightwave%20Technol&volume=28&issue=19&pages=2804-2809&publication_year=2010)

20. Yue Y et al (2012) Silicon-on-nitride waveguide with ultralow dispersion over an octave-spanning mid-infrared wavelength range. IEEE Photonics J 4(1):126–132
CrossRef (https://doi.org/10.1109/JPHOT.2011.2180016)
Google Scholar (http://scholar.google.com/scholar_lookup?title=Silicon-on-nitride%20waveguide%20with%20ultralow%20dispersion%20over%20an%20octave-spanning%20mid-infrared%20wavelength%20range&author=Y.%20Yue&journal=IEEE%20Photonics%20J&volume=4&issue=1&pages=126-132&publication_year=2012)

Copyright information

About this article

Cite this article as:

Bunruangses, M., Youplao, P., Amiri, I.S. et al. Plasmonics (2019). https://doi.org/10.1007/s11468-019-01083-9

- Received 12 August 2019
- Accepted 11 November 2019
- First Online 22 November 2019
- DOI https://doi.org/10.1007/s11468-019-01083-9
- Publisher Name Springer US
- Print ISSN 1557-1955
- Online ISSN 1557-1963