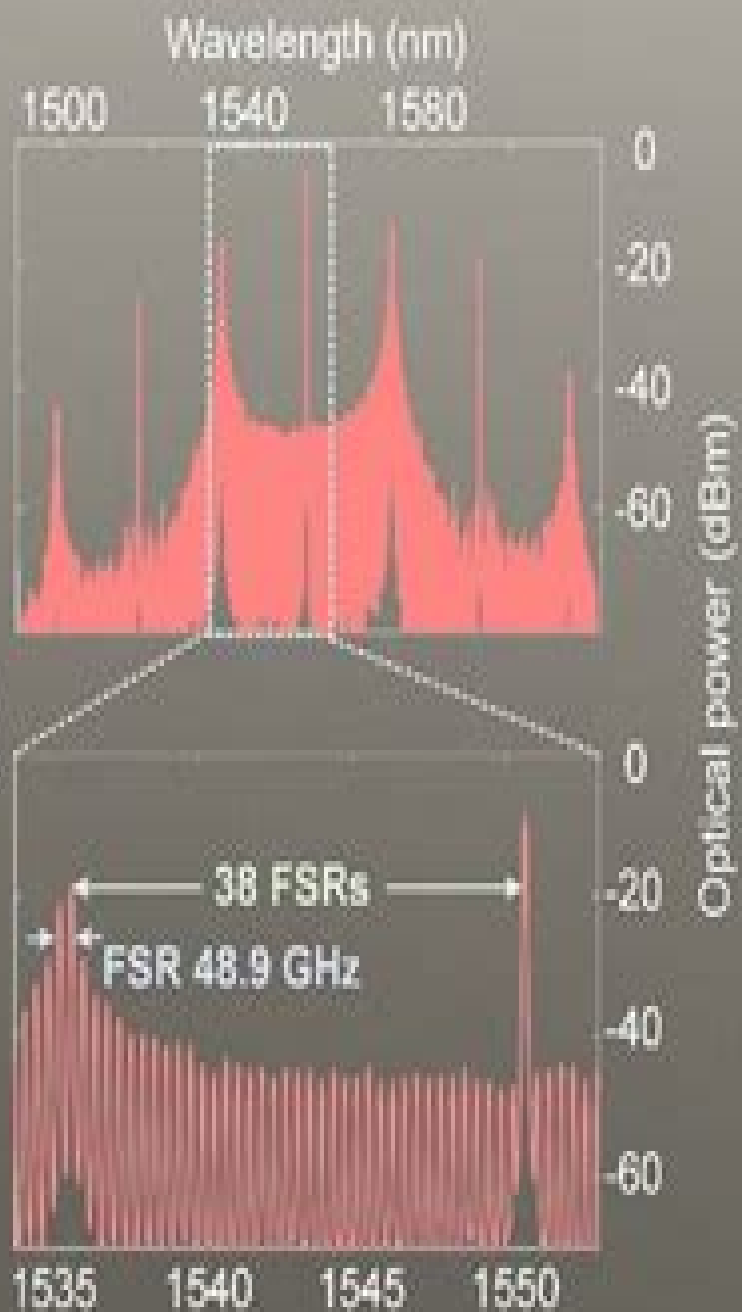
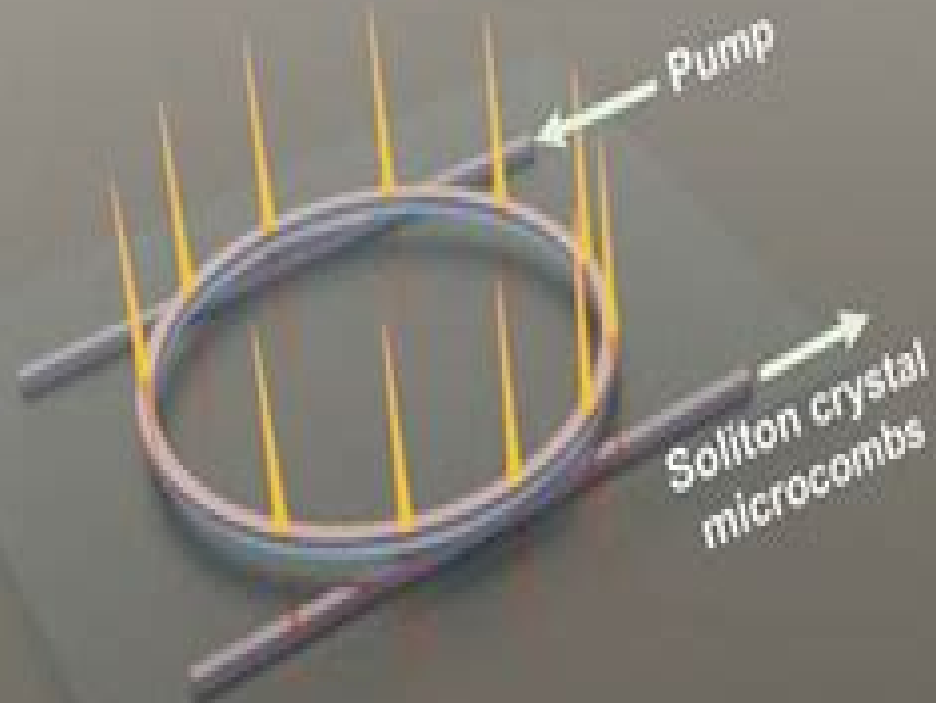




# Applications Soliton Generated Optical Resonator

**Preecha Yupapin**



## **Applications Soliton Generated Optical Resonator:**

Optical Soliton Communication Using Ultra-Short Pulses Iraj Sadegh Amiri, Harith Ahmad, 2015-05-07 This brief analyzes the characteristics of a microring resonator MRR to perform communication using ultra short soliton pulses. The raising of nonlinear refractive indices, coupling coefficients, and radius of the single microring resonator leads to a decrease in input power and round trips wherein the bifurcation occurs. As a result, bifurcation or chaos behaviors are seen at lower input power of 44 W where the nonlinear refractive index is  $n_2 = 3.2 \times 10^{-20} \text{ m}^2/\text{W}$ . Using a decimal convertor system, these ultra short signals can be converted into quantum information. Results show that multi solitons with FWHM and FSR of 10 pm and 600 pm can be generated respectively. The multi optical soliton with FWHM and FSR of 325 pm and 880 nm can be incorporated with a time division multiple access TDMA system wherein the transportation of quantum information is performed. *Ring Resonator Systems to Perform Optical Communication Enhancement Using Soliton* Iraj Sadegh Amiri, Abdolkarim Afroozeh, 2014-08-27 The title explains a new technique of secured and high capacity optical communication signals generation by using the micro and nano ring resonators. The pulses are known as soliton pulses which are more secured due to having the properties of chaotic and dark soliton signals with ultra short bandwidth. They have high capacity due to the fact that ring resonators are able to generate pulses in the form of solitons in multiples and train form. These pulses generated by ring resonators are suitable in optical communication due to use the compact and integrated rings system, easy to control, flexibility, less loss, application in long distance communication, and many other advantages. Using these pulses overcome the problems such as losses during the propagation, long distances, error detection using many repeaters or amplifiers, undetectable received signals, pulse broadening, overlapping, and so on. This book shows how to generate soliton pulses using ring resonators in the micro and nano range which can be used in optical communication to improve the transmission technique and quality of received signals in networks such as WiFi and wireless communication. *Soliton Coding for Secured Optical Communication Link* Iraj Sadegh Amiri, Sayed Ehsan Alavi, Sevia Mahdaliza Idrus, 2014-07-24 Nonlinear behavior of light such as chaos can be observed during propagation of a laser beam inside the microring resonator MRR systems. This Brief highlights the design of a system of MRRs to generate a series of logic codes. An optical soliton is used to generate an entangled photon. The ultra short soliton pulses provide the required communication signals to generate a pair of polarization entangled photons required for quantum keys. In the frequency domain, MRRs can be used to generate optical millimetre wave solitons with a broadband frequency of 0-100 GHz. The soliton signals are multiplexed and modulated with the logic codes to transmit the data via a network system. The soliton carriers play critical roles to transmit the data via an optical communication link and provide many applications in secured optical communications. Therefore, transmission of data information can be performed via a communication network using soliton pulse carriers. A system known as optical multiplexer can be used to increase the channel capacity and security of the signals. *Integrated Micro-Ring Photonics* Iraj

Sadegh Amiri,Abdolkarim Afroozeh,Harith Ahmad,2016-12-08 Micro ring resonators MRRs are employed to generate signals used for optical communication applications where they can be integrated in a single system These structures are ideal candidates for very large scale integrated VLSI photonic circuits since they provide a wide range of optical signal processing functions while being ultra compact Soliton pulses have sufficient stability for preservation of their shape and velocity Technological progress in fields such as tunable narrow band laser systems multiple transmission and MRR systems constitute a base for the development of new transmission techniques Controlling the speed of a light signal has many potential applications in fiber optic communication and quantum computing The slow light effect has many important applications and is a key technology for all optical networks such as optical signal processing Generation of slow light in MRRs is based on the nonlinear optical fibers Slow light can be generated within the micro ring devices which will be able to be used with the mobile telephone Therefore the message can be kept encrypted via quantum cryptography Thus perfect security in a mobile telephone network is plausible This research study involves both numerical experiments and theoretical work based on MRRs for secured communication

**Simulation of Optical Soliton Control in Micro- and Nanoring Resonator Systems** Suzairi Daud,Sevia Mahdaliza Idrus,Jalil Ali,2015-03-17 This book introduces optical soliton control in micro and nanoring resonator systems It describes how the ring resonator systems can be optimized as optical tweezers for photodetection by controlling the input power ring radii and coupling coefficients of the systems Numerous arrangements and configurations of micro and nanoring resonator systems are explained The analytical formulation and optical transfer function for each model and the interaction of the optical signals in the systems are discussed This book shows that the models designed are able to control the dynamical behaviour of generated signals

**Nanoscale Nonlinear PANDA Ring Resonator** Preecha Yupapin,Chat Teeka,J. Ali,2012-05-02 Microring nanoring resonator is an interesting device that has been widely studied and investigated by researchers from a variety of specializations This book begins with the basic background of linear and nonlinear ring resonators A novel design of nano device known as a PANDA ring resonator is proposed The use of the device in the form of a PANDA in applications such as nanoelectronics measurement communication sensors optical and quantum computing drug delivery hybrid transistor and a new concept of electron hole pair is discussed in detail

*Photonics and Nanotechnology* Preecha Yupapin,2008 Photonics and nanotechnology are popular emerging fields of technology This proceedings volume contains over 12 selected papers from the International Workshop and Conference on Photonics and Nanotechnology ICPN 2007 held in Pattaya Thailand from December 16 18 2007 The papers cover a wide range of topics from optical and nonlinear optical physics to nanoelectronics

*Comprehensive Materials Processing* ,2014-04-07 Comprehensive Materials Processing Thirteen Volume Set provides students and professionals with a one stop resource consolidating and enhancing the literature of the materials processing and manufacturing universe It provides authoritative analysis of all processes technologies and techniques for converting industrial materials from a raw

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Dissipative Solitons: From Optics to Biology and Medicine Nail Akhmediev, Adrian Ankiewicz, 2008-08-26 The dissipative soliton concept is a fundamental extension of the concept of solitons in conservative and integrable systems It includes ideas from three major sources namely standard soliton theory developed since the 1960s nonlinear dynamics theory and Prigogine s ideas of systems far from equilibrium These three sources also correspond to the three component parts of this novel paradigm This book explains the above principles in detail and gives the reader various examples

Small Scale Optics Preecha Yupapin, Jalil Ali, 2013-08-28 The behavior of light in small scale optics or nano micro optical devices has shown promising results which can be used for basic and applied research especially in nanoelectronics Small Scale Optics presents the use of optical nonlinear behaviors for spins antennae and whispering gallery modes within micro nano devices and circuits which can

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