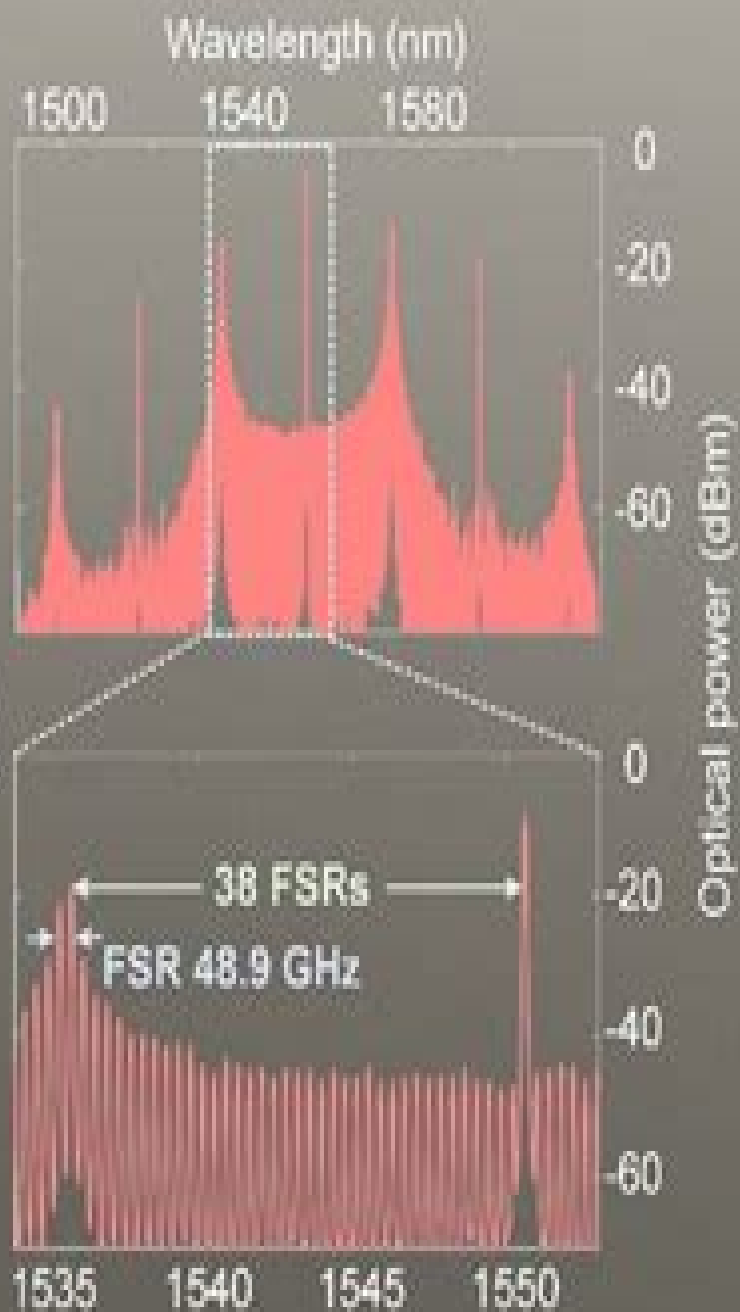
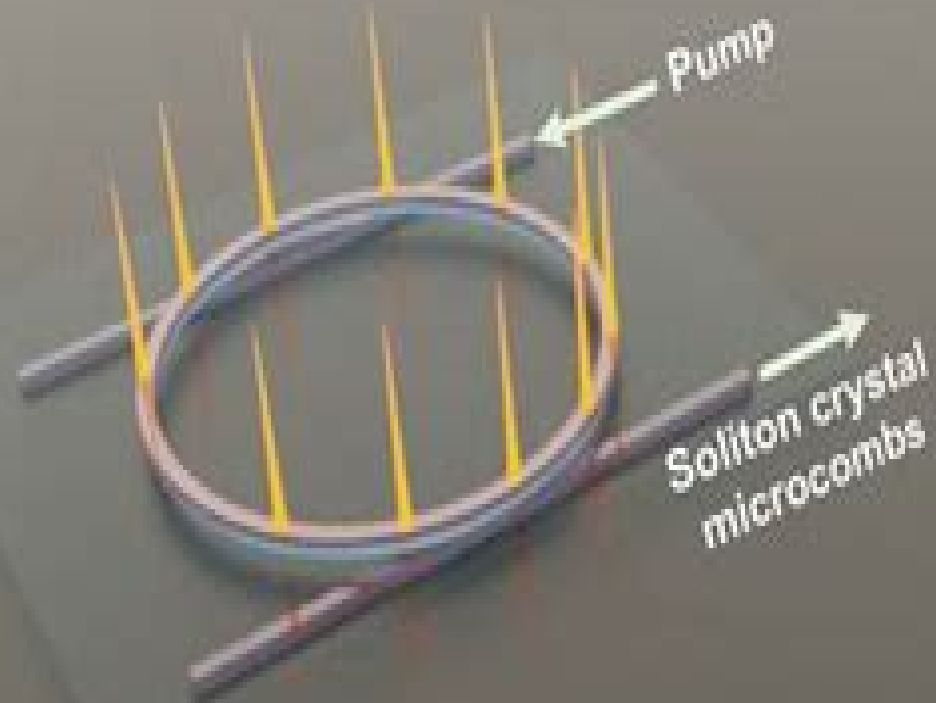




# Applications Soliton Generated Optical Resonator

**Iraj Sadegh Amiri, Abdolkarim  
Afroozeh, Harith Ahmad**



## **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 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 explain 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 show 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. 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 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 state into finished parts or products Assisting scientists and engineers in the selection design and use of materials whether in the lab or in industry it matches the adaptive complexity of emergent materials and processing technologies Extensive traditional article level academic discussion of core theories and applications is supplemented by applied case studies and advanced multimedia features Coverage encompasses the general categories of solidification powder deposition and deformation processing and includes discussion on plant and tool design analysis and characterization of processing techniques high temperatures studies and the influence of process scale on component characteristics and behavior Authored and reviewed by world class academic and industrial specialists in each subject field Practical tools such as integrated case studies user defined process schemata and multimedia modeling and functionality Maximizes research efficiency by collating the most important and established information in one place with integrated applets linking to relevant outside sources **Soliton-driven Photonics** A.D. Boardman,A.P.

Sukhorukov,2012-12-06 It is ironic that the ideas of Newton which described a beam of light as a stream of particles made it difficult for him to explain things like thin film interference Yet these particles called photons have caused the adjective photonic to gain common usage when referring to optical phenomena The purist might argue that only when we are confronted by the particle nature of light should we use the word photonics Equally the argument goes on only when we are face to face with an integrable system i e one that possesses an infinite number of conserved quantities should we say soliton rather than solitary wave Scientists and engineers are pragmatic however and they are happy to use the word soliton to describe what appears to be an excitation that is humped multi humped or localised long enough for some use to be made of it The fact that such solitons may stick to each other fuse upon collision is often something to celebrate for an application rather than just evidence that after all these are not really solitons in the classic sense Soliton therefore is a widely used term with the qualification that we are constantly looking out for deviant behaviour that draws our attention to its solitary wave character In the same spirit photonics is a useful generic cover all noun even when electromagnetic theory or optics would suffice

## Whispering the Strategies of Language: An Psychological Journey through **Applications Soliton Generated Optical Resonator**

In a digitally-driven earth where screens reign great and instant interaction drowns out the subtleties of language, the profound techniques and mental nuances hidden within phrases often get unheard. Yet, nestled within the pages of **Applications Soliton Generated Optical Resonator** a fascinating fictional value sporting with natural emotions, lies an extraordinary journey waiting to be undertaken. Published by a skilled wordsmith, this wonderful opus attracts readers on an introspective trip, delicately unraveling the veiled truths and profound influence resonating within ab muscles fabric of each and every word. Within the emotional depths of this poignant review, we will embark upon a genuine exploration of the book is key themes, dissect its captivating writing model, and succumb to the effective resonance it evokes strong within the recesses of readers hearts.

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