

# **MICRORING RESONATORS: FABRICATION AND APPLICATIONS IN SOLITON COMMUNICATIONS**



**Microring resonators:  
fabrication and  
applications in  
soliton  
communications**

A. AFROOZEH ,  
I. S. AMIRI ,  
Y. FARHANG ,  
A. ZEINALINEZHAD ,

# Microring Resonators Fabrication Applications Communications

**Guangya Zhou, Chengkuo Lee**



## **Microring Resonators Fabrication Applications Communications:**

**Microring Resonators** A. Afroozeh, I. S. Amiri, A. Zeinalinezhad, Y. Farhang, 2015-12-03 This study starts with design considerations the functional behaviour and key characteristics of the microring resonator and add drop ring resonators allowing the performance of higher order filters For nonlinear materials the basic equations to describe the formation and propagation of different types of optical solitons are well known The resonance condition is satisfied when the circumference of the microring resonators or generally the round trip length is equal to an integer multiple of the optical wavelength inside the medium The chaotic behaviour of the multi output signals generated from these devices can be filtered using appropriate parameters Optical chaos is observed in many non linear optical systems One of the most common examples is a microring resonator Chaotic behaviour has been considered as a nonlinear property in physics electronics and communication Soliton is a self reinforcing solitary wave a wave packet or pulse that maintains its shape while it travels at constant speed Among all the types of solitons optical vector solitons draw the most attention due to their wide range of applications particularly in generating ultrafast pulses and light control technology Dark solitons are much less stable due to the cross interaction between the two polarization components The bus waveguides of the microring resonator are cladded by silica which serves both to improve modal confinement and facilitate wafer bonding for structural support The source of nonlinear reaction is related to harmonic motion of bound electrons under the influence of an applied field The total polarization  $P$  induced by electric dipoles is not linear in the electric field The extent that the signal degrades depends on the purity of the glass and the wavelength of the transmitted light This refractive index variation is responsible for the nonlinear optical effects of self focusing self phase modulation and modulation instability and is the basis for Kerr lens mode locking The quality factor of a resonator is a measure of the sharpness of the resonance Therefore the optimum fabrication process can be obtained with respect to higher quality factor of the device The phenomenon of optical bistability within the system arises from a combination of the nonlinearity in the radiation matter interaction and of a feedback mechanism **Handbook of Silicon**

**Photonics** Laurent Vivien, Lorenzo Pavesi, 2016-04-19 The development of integrated silicon photonic circuits has recently been driven by the Internet and the push for high bandwidth as well as the need to reduce power dissipation induced by high data rate signal transmission To reach these goals efficient passive and active silicon photonic devices including waveguide modulators photodetectors **Advances in Smart Communication Technology and Information Processing** Soumen Banerjee, Jyotsna Kumar Mandal, 2021-02-15 This book is a collection of best selected research papers presented at the 6th International Conference on Opto Electronics and Applied Optics OPTRONIX 2020 organized by the University of Engineering Management Kolkata India in June 2020 The primary focus is to address issues and developments in optoelectronics with particular emphasis on communication technology IoT and intelligent systems information processing and its different kinds The theme of the book is in alignment with the theme of the conference Advances in Smart

Communication Technology and Information Processing The purpose of this book is to inform the scientists and researchers of this field in India and abroad about the latest developments in the relevant field and to raise awareness among the academic fraternity to get them involved in different activities in the years ahead an effort to realize knowledge based society

**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

**Integrated Optics: Theory and Applications** Tadeusz Pustelny, Paul V. Lambeck, Christophe Gorecki, 2005 Proceedings of SPIE present the original research papers presented at SPIE conferences and other high quality conferences in the broad ranging fields of optics and photonics These books provide prompt access to the latest innovations in research and technology in their respective fields Proceedings of SPIE are among the most cited references in patent literature

**Advances in Computer, Communication and Control** Utpal Biswas, Amit Banerjee, Sukhomay Pal, Arindam Biswas, Debashis Sarkar, Sandip Haldar, 2019-02-14 The book discusses the recent research trends in various sub domains of computing communication and control It includes research papers presented at the First International Conference on Emerging Trends in Engineering and Science Focusing on areas such as optimization techniques game theory supply chain green computing 5g networks Internet of Things social networks power electronics and robotics it is a useful resource for academics and researchers alike

**Summaries of Papers Presented at the Optical Fiber Communication Conference ...**, 2001 *Nanomaterials, Polymers and Devices* E. S. W. Kong, 2015-04-27 Providing an eclectic snapshot of the current state of the art and future implications of the field *Nanomaterials Polymers and Devices Materials Functionalization and Device Fabrication* presents topics grouped into three categorical focuses The synthesis mechanism and functionalization of nanomaterials such as carbon nanotubes graphene silica and quantum dots Various functional devices which properties and structures are tailored with emphasis on nanofabrication Among discussed are light emitting diodes nanophotonic nano optical and photovoltaic devices Nanoelectronic devices which include semiconductor nanotube and nanowire based electronics single walled carbon nanotube based nanoelectronics as well as thin film transistors

*Photonics Packaging, Integration, and Interconnects*, 2007 **ICO20** Yun-Chur Chung, Shizhong Xie, 2006 Proceedings of SPIE present the original research papers presented at SPIE conferences and other high quality conferences in the broad

ranging fields of optics and photonics These books provide prompt access to the latest innovations in research and technology in their respective fields Proceedings of SPIE are among the most cited references in patent literature

*European Conference on Optical Communication*, 2002      **Design of Polymeric Directional Couplers for Wavelength Selective Optical Filter Applications Fabricated Using Hot-embossing Technique** Ganesh Murugesan, 2004      Optical MEMS, Nanophotonics, and Their Applications Guangya Zhou, Chengkuo Lee, 2017-12-14 This book covers device design fundamentals and system applications in optical MEMS and nanophotonics Expert authors showcase examples of how fusion of nanoelectromechanical NEMS with nanophotonic elements is creating powerful new photonic devices and systems including MEMS micromirrors MEMS tunable filters MEMS based adjustable lenses and apertures NEMS driven variable silicon nanowire waveguide couplers and NEMS tunable photonic crystal nanocavities The book also addresses system applications in laser scanning displays endoscopic systems space telescopes optical telecommunication systems and biomedical implantable systems Presents efforts to scale down mechanical and photonic elements into the nano regime for enhanced performance faster operational speed greater bandwidth and higher level of integration Showcases the integration of MEMS and optical photonic devices into real commercial products Addresses applications in optical telecommunication sensing imaging and biomedical systems Prof Vincent C Lee is Associate Professor in the Department of Electrical and Computer Engineering National University of Singapore Prof Guangya Zhou is Associate Professor in the Department of Mechanical Engineering at National University of Singapore      Microresonators as Building Blocks for VLSI Photonics American Institute of Physics, 2004-06-08 The aim of the course was to provide state of the art information in the field of advanced devices for large scale integrated photonics The course focused on the theory and application of optical microresonators for wavelength selection and routing for switching and for high speed modulation Also materials aspects design and manufacturing of integrated optics devices based on these resonators for use in optical communication networks were discussed In particular micro ring and micro disk resonators and photonic band gap structures were addressed At a more fundamental level some lectures were devoted to promising phenomena that could allow new applications in photonics such as entangled pairs generation and single quantum dot emission in a cavity

**Polymer Microring Resonator and Its Application as a Biosensor** Chung-Yen Chao, 2005      Enabling Photonics Technologies for Defense, Security, and Aerospace Applications, 2005      *Optical Devices for Fiber Communication*, 1999

**Optical Microresonators** John Heebner, Rohit Grover, Tarek A. Ibrahim, 2008 Optical Micro Resonators are an exciting new field of research that has gained prominence in the past few years due to the emergence of new fabrication technologies This book is the first detailed text on the theory fabrication and applications of optical micro resonators and will be found useful by both graduate students and researchers in the field      *Materials and Devices for Optical and Wireless Communications* Connie J. Chang-Hasnain, Yuxing Xia, 2002      Micro (MEMS) and Nanotechnologies for Defense and

Security Thomas George,Z.-Y. Cheng,2007 Proceedings of SPIE present the original research papers presented at SPIE conferences and other high quality conferences in the broad ranging fields of optics and photonics These books provide prompt access to the latest innovations in research and technology in their respective fields Proceedings of SPIE are among the most cited references in patent literature

## Whispering the Techniques of Language: An Mental Quest through **Microring Resonators Fabrication Applications Communications**

In a digitally-driven earth where displays reign great and instant interaction drowns out the subtleties of language, the profound strategies and psychological nuances hidden within words usually get unheard. Yet, located within the pages of **Microring Resonators Fabrication Applications Communications** a charming literary treasure blinking with organic feelings, lies a fantastic quest waiting to be undertaken. Penned by a skilled wordsmith, this charming opus attracts visitors on an introspective journey, lightly unraveling the veiled truths and profound influence resonating within the very cloth of each word. Within the emotional depths of this touching review, we shall embark upon a heartfelt exploration of the book is primary styles, dissect their charming publishing type, and succumb to the powerful resonance it evokes serious within the recesses of readers hearts.

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### **Microring Resonators Fabrication Applications Communications Introduction**

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