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موضوع: افزاره

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اتاق مجازی ۱

احمدامین علایی فرد	**بررسی و مدلسازی رشد ساختار ابرشبکه InAs/GaSb بر روی زیرلایه کترنری** احمدامین علایی فرد ، وحیدرضا یزدان پناه دانشگاه علم و صنعت ایران امروزه ساختارهای ابرشبکه (super lattice structures) در موارد بسیار زیادی نظیر تزانزیستورها، لیزرها و فوتودیودها کاربرد دارند. با شبیه‌سازی رشد این مواد پیش از ساخت می‌توان هزینه ساخت ماده اولیه را کاهش داد و از هدررفت منابع جلوگیری کرد. با تغییر ضخامت لایه‌های مختلف ساختارهای ابرشبکه گاف انرژی و طول موج جذب یا نشر نور متناسب با آن در رنج وسیعی تغییر می‌کند که امکان رشد ادوات با کاربردهای مختلف را به ما می‌دهد. یکی از مشکلاتی که در رشد ساختارهای ابرشبکه وجود دارد این است که با تغییر ضخامت لایه‌ها برای دستیابی به گاف انرژی مطلوب ثابت شبکه کریستالی ساختارابرشبکه تغییر می‌کند و امکان رشد آن بر روی زیرلایه به دلیل عدم انطباق زیاد وجود ندارد. در این مقاله قصد بر این است که رشد ابرشبکه InAs/GaSb بر روی زیرلایه از جنس مواد چهارگانه یا کترنری (quaternary) بررسی شود. ترکیب ماده کترنری به نحوی بهینه می‌شود که امکان رشد ضخامت‌های متفاوت ساختار ابرشبکه با عدم انطباق زیر ۱ درصد به دست بیاید.
محمد رضا اسلامی	**Design and simulation of optical XNOR logic gate based on MEMS technology** **Mohammadreza Eslami, Fahimeh Marvi, Kian Jafari Dinani** **Sahand University of Technology** **Prototypes of computers, or processors, were based almost exclusively on mechanical devices. Although electronic processors have become increasingly dominant over the past few decades, Recent advances in the technology of manufacturing 3D electromechanical components in micro and nano sizes have created new techniques for building complex microstructures that are of interest to researchers in new research In the field of mechanical computing. In this paper, we present a new XNOR logic gate design approach that can be built based on micro-electro-mechanical logic gates. One of the main advantages of this method is the ability to combine multi-physical as well as compatibility with the CMOS manufacturing process, as well as lower power consumption compared to logic gates consisting of several CMOS transistors. In this design, we have designed and simulated an XNOR logic gate using the multi-physics capability of Comsol-software and as well as using optical,**

electronic, mechanical and electro-static physics, whose inputs will be both electrical and optical signals. In this paper, according to the above selected design, by modeling and simulating different input modes of this logic gate, we examine the effect of each mode on the output of the gate as well as other features such as structure life, power consumption and resonant frequency. The proposed gate structure has a resonant frequency of 46 kHz and is highly reliable because it can operate without mechanical connection of the MEMS operator to logic inputs	
An ultrasonic tomography flowmeter implementation for gas/liquid two-phase flow measurement **Omid Qorbani, Esmaeil Najafiaghdam** **Sahand University of Technolog** **Today's ultrasonic flow metering is very important in the industry. By using ultrasound tomography, we can be obtained cross-sectional images from inside a tube that contains two-phase fluid. By processing these images, the flow of each phase can be calculated separately. Time of flight ultrasonic tomography was used in the proposed method and does not be used conventional methods for image reconstruction. The flow rate of each phase is obtained directly from the sensitivity matrix. The proposed method is independent of flow pattern identification and then there is no need to calibration and as a result, the system is stable. One MHz piezoelectric was used to implement the proposed method and 16 piezoelectric was mounted to implement for a fan-shaped ring, also a four-channel AFE board with a sampling speed of 105 MHz and a 14-bit resolution was used. All control signals are generated by FPGA and there is no need for a microprocessor to control the process. A very simple power amplifier is used to drive the piezoelectric which has low power consumption and contributes to the stability of the system. The simulation results of the measured values show a low error of the SIE factor.**	**امید قربانی**
بررسی عملکرد لیزرهای نقطه کوانتومی دو طول موجه برای افزایش پهنای باند **سیدعطا سیدبادامی، نادر قبادی، سیدعلی حسینی مرادی** **دانشگاه تبریز** **در این مقاله با استفاده از لیزر نقطه کوانتومی دو طول موجه تحت تزریق قفل نوری به بررسی تحلیل عملکرد این لیزرها در تزریق همزمان نور به هردو تراز پایه و برانگیخته پرداخته شده است که برای این منظور با استفاده از روش های حل عددی وآنالیز سیگنال کوچک، بررسی پهنای باند صورت گرفته است. سپس با**	**سیدعطا سیدبادامی**

	مقایسه ای بین تزریق در حالت منفرد به هر تراز با تزریق همزمان به هردو تراز در نسبتهای تزریق مختلف و فرکانس های ناتنظیمی مختلف، به بررسی نتایج در جهت افزایش پهنای باند پرداخته شده است.
آرش یزدان پناه	**Bandgap Engineering of Armchair Germanene Nanoribbons by Edge Passivation: A First Principles Study** **Arash Yazdanpanah, Arian Abootorabian** **Sahand University of Technolog** **Germanene is a two-dimensional material similar to graphene with a honeycomb structure in which germanium atoms are replaced by carbon atoms, the difference is that the distances between the atoms (in a perpendicular direction to the plate) are larger and they have a buckled structure. In this paper, the band-gap engineering of armchair germanene nanoribbons is performed by changing the passivation of the edge atoms. By increasing the width of the ribbons, the band-gap size is decreased according to three different trends. Also, changing the edge passivating atoms at any given width causes various changes in the band- gap size**.
آرش هدایی	**Effect of the QW number to produce circular single-mode beam in 1060 nm laser diodes** **Arash Hodaei, Seyed Peyman Abbasi** **Iranian National Center for Laser Scince & Technology** **The practical importance of 1064 nm single-mode beams in fiber lasers as a source has led to extensive research into increasing the power of these lasers. In this paper, by using an asymmetric structure in a 1064 nm laser, the internal loss of the laser is reduced. The increase in the number of quantum wells (QWs) in the active region was also investigated. The results show that in the case of high thickness waveguide, where the confinement factor is low, increasing the number of QWs will increase the power, but the power portion of the fundamental mode is decreased and higher order modes are excited. Therefore, using of the active region including single-quantum well (SQW) is the best case for circular single mode beam.**

Dark Current Evaluation in HgCdTe-based nBn Infrared Detectors **Maryam Shaveisi, Peiman Aliparast** **Aerospace Research Institute (Ministry of Science, Research and Technology)** **A High Operating Temperature (HOT) design of MW/LWIR infrared xBn phtodetector based on the HgCdTe/HgCdTe is very important. Because the operation temperature of the focal plane array (FPA) imagers is critical. In this paper, we present a theoretical study of HgCdTe-based nBn detectors at 300 Kelvin. The simulation results show that parameters such as mole fraction and the thickness of the barrier layer as well as doping of the absorber layer can be optimized for higher performance. The valence band offset in HgCdTe nBn detectors can be minimized by controlling above-mentioned parameters. Evaluation of the simulation results in a temperature of 300 Kelvin and a voltage of -0.3Volts prove that with increasing doping concentration of the absorber layer, the dark current increases about 93.23%. Also, the dark current decreases approximately 95.07% by changing the mole fraction of Cd in the Hg1−xCdxTe alloy. Therfore, the simulation results indicate that the dark current has significantly decreased with increasing the "x" mole fraction of the barrier layer and decreasing the doping of the absorber layer.**	مریم شاویسی