ΟΠΤΙΚΗ ΕΠΙΣΤΗΜΗ ΚΑΙ ΤΕΧΝΟΛΟΓΙΑ

Πιθανά Βιβλιογραφικά Θέματα

Acousto-Optic Tunable Filters

Fiber optic tunable filters are needed for telecommunications applications.
H. S. Kim, S. H. Yun, I. K. Kwang, and B. Y. Kim, "All-fiber acousto-optic tunable notch filter with electronically controllable spectral profile," Opt. Lett., vol. 22, pp. 1476-1478, Oct. 1, 1997.

Acousto-Optic Tunable Lasers

Lasers that can be tuned and can be integrated are needed in many applications.
K. Schafer, I. Baumann, W. Sohler, H. Suche, and S. Westenhofer, "Diode-pumped and packaged acousto-optically tunable Ti:Er:LiNbO(3) waveguide laser of wide tuning range," IEEE J. Quantum. Electron., vol. 33, pp. 1636-1641, Oct. 1997.

Add-Drop Filters

In wavelength division multiplexing systems, add-drop filters are essential for adding and deleting channels.
J. Capmany, P. Munoz, and D. Pastor, "Optimum design and performance evaluation of an all-fiber add-drop multiplexer based on a grating coupler," IEEE J. Select. Topics Quantum Electron., vol. 5, pp. 1392-1399, Sept./Oct. 1999.

All-Optical Switches

Optical switches can be constructed that are activated by light.
D. M. Marom and D. Mendlovic, "Compact all-optical bypass-exchange switch," Appl. Opt., vol. 35, pp. 248-253, Jan. 10, 1996.

Analog-to-Digital Converters

Analog-to-digital (A/D) conversion needs to be performed rapidly and accurately in many applications.
M. Johansson, B. Lofving, S. Hard, L. Thylen, M. Mokhtari, U. Westergren, and C. Pala, "Study of an ultrafast analog-to-digital conversion scheme based on diffractive optics," Appl. Opt., vol. 39, pp. 2881-2887, June 10, 2000.

Arrayed-Waveguide Grating Routers

In telecommunications it is necessary to be able to switch and to rout various

wavelength signals from one channel to another, such as with an arrayed-waveguide grating router.
A. Sugita, A. Kaneko, K. Okamoto, M. Itoh, A. Himeno, and Y. Ohmori, "Very low insertion loss arrayed-waveguide grating with vertically tapered waveguides," IEEE Photon. Technol. Lett., vol. 12, pp. 1180-1182, Sept. 2000.

Beam Array Generators

Multiple equal-intensity coherent beams are needed in many applications.
M. Ghisoni, H. Martinsson, N. Eriksson, M. Li, A. Larsson, J. Bengtsson, A. Khan, and G. Parry, "4 x 4 fan-out spot generator using GaAs based VCSEL's and diffractive optical element," IEEE Photon. Technol. Lett., vol. 9, pp. 508-510, Apr. 1997.

Birefringent Phase Retarders

Accurate waveplates are needed in many applications.
E. A. West and M. H. Smith, "Polarization errors associated with birefringent waveplates," Opt. Engr., vol. 34, pp. 1574-1580, June 1995.

Birefringent Polarizers

Polarizers with large extinction ratios are needed in demanding applications.
R. C. Twu, C. C. Huang, and W. S. Wang, "Zn indiffusion waveguide polarizer on a Y-cut LiNbO(3) at 1.32-um wavelength," IEEE Photon. Technol. Lett., vol. 12, pp. 161-163, Feb. 2000.

Birefringent Tunable Filters

Tunable lasers require wavelength-selective filters.
J. Staromlynska, S. M. Rees, and M. P. Gillyon, "High-performance tunable filter," Appl. Opt., vol. 37, pp. 1081-1088, Feb. 20, 1998.

Blood Oxygen Measurement Systems

Determining the oxygen content of blood is useful in diagnosing and developing treatment plans for tumors.
H. Liu, Y. Song, K. L. Worden, X. Jiang, A. Constantinescu, and R. P. Mason, "Noninvasive investigation of blood oxygenation dynamics of tumors by near-infrared spectroscopy," Appl. Opt., vol. 39, pp. 5231-5243, Oct. 1, 2000.

Blue Semiconductor Lasers

Semiconductor lasers emitting blue light have traditionally not been

available, but are needed in many applications.
N. M. Johnson, A. V. Nurmikko, and S. P. DenBaars, "Blue diode lasers," Phys. Today, vol. 53, pp. 31-36, Oct. 2000.

Charge-Coupled-Device Cameras

Charge-Coupled-Device (CCD) cameras are needed in biomedical engineering, manufacturing, and in other fields.
G. McAnally, "CCD cameras mature and diversify," Laser Focus World, vol. 36, pp. 101-104, Apr. 2000.

Compact Disks

Large amounts of information are routinely stored on compact disks (CD's) and even higher capacity versions are being developed.
K. Saito, K. Kishima, and I. Ichimura, "Readout signals calculated for near-field optical pickups with land and groove recording," Appl. Opt., vol. 39, pp. 4153-4159, Aug. 10, 2000.

Compact Disk Reading Heads

Compact disk players need efficient, inexpensive, reliable reading heads.
T. Shiono and H. Ogawa, "Planar-optic-disk pickup with diffractive micro-optics," Appl. Opt., vol. 33, pp. 7350-7355, Nov. 1, 1994.

Computer-Designed Lenses

Complex lens systems can be designed and optimized using optics software.
D. Y. Wang, D. M. Aikens, and R. E. English Jr., "Design of optical systems with both near-field and far-field system requirements," Opt. Eng., vol. 39, pp. 1788-1795, July 2000.

Differential-Interference Contrast (Nomarski) Microscopes

Differential-interference contrast (Nomarski) microscopy can reveal refractive index or thickness changes in transparent materials.
C. Preza, D. L. Snyder, and J. A. Conchello, "Theoretical development and experimental evaluation of imaging models for differential-interference-contrast microscopy," J. Opt. Soc. Amer. A, vol. 16, pp. 2185-2199, Sept. 1999.

Diffractive Beam Shapers

Laser beams can be shaped to be other than Gaussian in profile.

J. R. Leger, D. Chen, and G. Mowry, "Design and performance of diffractive optics for custom laser resonators," Appl. Opt., vol. 34, pp. 2498-2509, May 10, 1995.

Diffractive Beam Scanners

Beam scanners can be implemented with spinning diffraction gratings.
L. D. Dickson and G. T. Sincerbox, "Holographic scanners for bar code readers" in G. F. Marshall, ed., Optical Scanning. New York: Marcel Dekker, 1991.

Diffractive Beamsplitters

Efficient beamsplitters can be implemented using a diffraction grating element.
N. Rajkumar and J. N. McMullin, "V-groove gratings on silicon for infrared beam splitting," Appl. Opt., vol. 34, pp. 2556-2559, May 10, 1995.

Diffractive Grating Demultiplexers

Gratings can be used to demultiplex multiple wavelength channels.
E. G. Churin, P. Bayvel, J. E. Midwinter, and A. M. Hill, "The influence of aperture size and shape on crosstalk level in free-space grating demultiplexers for WDM networks," IEEE Photon. Technol. Lett., vol. 8, pp. 1337-1339, Oct. 1996.

Diffractive Grating Waveguide Couplers

Couplers are needed to get light into and out of waveguides.
D. Pascal, R. Orobtchouk, A. Layadi, A. Koster, and S. Laval, "Optimized coupling of a Gaussian beam into an optical waveguide with a grating coupler: Comparison of experimental and theoretical results," Appl. Opt., vol. 36, pp. 2443-2447, Apr. 20, 1997.

Diffractive Lenses

Diffractive lenses can be cost-effective substitutes for refractive lenses.
Y. Arieli, S. Ozeri, N. Eisenberg, and S. Noach, "Design of a diffractive optical element for wide spectral bandwidth," Opt. Lett., vol. 23, pp. 823-824, June 1, 1998.

Diffractive Polarizers

Polarizers can be implemented using grating diffraction.

S. Q. Liu, Y. S. Chen, N. J. Wu, and A. Ignatiev, "Realization of a polarizer employing the combined effects of birefringence and diffraction," Opt. Lett., vol. 22, pp. 1518-1520, Oct. 1, 1997.

Distributed Bragg Reflector Lasers

Bragg reflectors can provide efficient feedback in semiconductor lasers.
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Distributed Feedback Lasers

Semiconductor lasers with distributed feedback provide stable sources for telecommunications and other applications.
A. M. S. Z. Amiri, X. Li, and W. P. Huang, "Above-threshold analysis of second-order circular-grating DFB lasers," IEEE J. Quantum Electron., vol. 36, pp. 259-267, Mar. 2000.

Electro-Optic Amplitude Modulators

Amplitude modulators are the basis of many telecommunications systems.
S. J. Chang, C. L. Tsai, Y. B. Lin, J. F. Liu, W. S. Wang, "Improved electrooptic modulator with ridge structure in X-cut LiNbO(3)," J. Lightwave Technol., vol. 17, pp. 843-847, May 1999.

Electro-Optic Frequency Stabilizers

Stabilization of a laser's wavelength is important in critical applications.
V. Bernard, C. Daussy, G. Nogues, L. Constantin, P. E. Durand, A. Amy-Klein, A. V. Lerberghe, and C. Chardonnet, "CO(2) laser stabilization to 0.1-Hz level using external electroopic modulation," IEEE J. Quantum Electron., vol. 33, pp 1282-1287, Aug. 1997.

Electro-Optic Imagers

Ultra-fast imaging is required in some scientific and industrial applications.
Z. Jiang and X. C. Zhang, "Terahertz imaging via electrooptic effect," IEEE Microwave Theory Tech., vol. 47, pp. 2644-2650, Dec. 1999.

Electro-Optic Phase Modulators

Fast phase modulators are important in telecommunications and other

applications.
D. S. Kim, M. Arisawa, A. Morimoto, and T. Kobayashi, "Femtosecond optical pulse generation using quasivelocity-matched electrooptic phase modulator," IEEE J. Selected Topics Quantum Electron., vol. 2, pp. 493-499, Sept. 1996.

Electro-Optic Tunable Filters

Fast tunable filters are needed in spectroscopy and telecommunications.
R. P. Netterfield, C. H. Freund, J. A. Seckold, and C. J. Walsh, "Design of a lithium niobate Fabry-Perot etalon-based spectrometer," Appl. Opt., vol. 36, pp. 4556-4561, July 1, 1997.

Electro-Optic Tunable Lenses

Rapidly tunable lenses can be useful in many applications.
Q. W. Song, X. M. Wang, and F. Haritatos, "Test and analysis of an electro-optic dynamic diverging lens for three-dimensional optical memories," Appl. Opt., vol. 36, pp. 1796-1803, Mar. 10, 1997.

Ellipsometers

The measurement of photoresist and oxide thickness and indices of refraction can be accomplished with an ellipsometer.
M. G. Boudreau, S. G. Wallace, G. Balcaitis, S. Murugkar, H. K. Haugen, and P. Mascher, "Application of in situ ellipsometry in the fabrication of thin-film optical coatings on semiconductors," Appl. Opt., vol. 39, pp. 1053-1058, Feb. 20, 2000.

Endoscopes

Endoscopic examination is a minimally invasive medical diagnostic procedure.
B. Kemper, D. Dirksen, W. Avenhaus, A. Merker, and G. V. Bally, "Endoscopic double-pulse electronic-speckle-pattern interferometer for technical and medical intracavity inspection," Appl. Opt., vol. 39, pp. 3899-3905, Aug. 1, 2000.

Erbium-Doped Fiber Amplifiers

Amplifiers are needed to boost the optical signal strength for long haul transmission.
A. Bononi and L. Barbieri, "Design of gain-clamped doped-fiber amplifiers for optimal dynamic performance," J. Lightwave Technol, vol. 17, pp. 1229-1240, July 1999.

Erbium-Doped Fiber Lasers

In-fiber lasers at telecommunications wavelengths are potentially very significant.
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Fiber Bragg Grating Dispersion Compensators

Dispersion compensation is needed in fiber optic networks.
L. D. Garret, A. H. Gnauck, R. W. Tkach, B. Agogliati, L. Arcangeli, D. Scarano, V. Gusmeroli, C. Tosetti, G. D. Maio, and F. Forghieri, "Cascaded chirped fiber gratings for 18-nm-bandwidth dispersion compensation," IEEE Photon. Technol. Lett., vol. 12, pp. 356-358, Mar. 2000.

Fiber Bragg Grating Pulse Compressors

Pulse compression is needed in scientific and telecommunications applications.
G. Lenz, B. J. Eggleton, and N. Litchinitser, "Pulse compression using fiber gratings as highly dispersive nonlinear elements," J. Opt. Soc. Amer. B, vol. 15, pp. 715-721, Feb. 1998.

Fiber Bragg Grating Sensors

Fiber Bragg gratings can be used to measure strain, temperature, refractive index, and other quantities.
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Fiber Optic Connectors

Reliable, inexpensive connectors are needed for single-mode fibers.
S. Yanagi, H. Sato, Y. Shuto, M. Ohno, and S. Tohno, "Optical characteristics of injection molded plastic ferrules for single-mode optical fiber applications," IEEE J. Select. Topics Quantum Electron., vol. 5, pp. 1266-1270, Sept./Oct. 1999.

Grating Spectrometers

Spectrometers are needed to disperse light accurately into its component wavelengths.
E. F. Erickson and D. Rabanus, "Beam shape effects on grating spectrometer resolution," Appl. Opt., vol. 39, pp. 4486-4489, Sept. 1, 2000.

Head-Mounted Displays

Head-mounted or helmet-mounted displays will be invaluable in facilitating human-computer interfacing in a wide variety of applications.
H. Hua, A. Girardot, C. Gao, and J. P. Rolland, "Engineering of head-mounted projective displays," Appl. Opt., vol. 39, pp. 3814-3824, Aug. 1, 2000.

High-Brightness Light Emitting Diodes

Nitride-based semiconductors are capable of emitting very intensities for automotive, traffic control, and other applications.
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Holographic Security Labels

Holographic security labels are need to authenticate documents and products.
M. R. Descour, W. C. Sweatt, and K. D. Krenz, "Mass-producible micotags for security applications: calculated fabrication tolerances by rigorous coupled-wave analysis," Opt. Eng., vol. 37, pp. 1254-1261, Apr. 1998.

Hybrid Refractive-Diffractive Lenses

A combination of refractive and diffractive elements can provide a highly corrected lens.
M. D. Missig and G. M. Morris, "Diffractive optics applied to eyepiece design," Appl. Opt., vol. 34, pp. 2452-2461, May 10, 1995.

Intersubband Lasers

Semiconductor intersubband lasers can provide custom-wavelength sources for near-infrared and mid-infrared applications such as sensing.
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Laser Eye Surgery Systems

Laser systems can be used to correct human vision deficiencies.
T. Juhasz, F. H. Loesel, R. M. Kurtz, C. Horvath, J. F. Bille, and G. Mourou, "Corneal refractive surgery with femtosecond lasers," IEEE J. Select. Topics Quantum Electron., vol. 5, pp. 902-910, July/Aug. 1999.

Long-Period Fiber Grating Dispersion Compensators

Long-period fiber gratings are needed for a variety of applications in telecommunications such as dispersion compensation.
D. B. Stegall and T. Erdogan, "Dispersion control with use of long-period fiber gratings," J. Opt. Soc. Amer. A, vol. 17, pp. 304-312, Feb. 2000.

Long-Period Fiber Grating Polarizers

Fiber polarizers are needed in telecommunications and other applications.
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Metamaterials and Negative Refraction

C. M. Soukoulis, “Bending back light: the science of negative index materials” *Optics & Photonics News*, v. 17, no. 6, pp. 16-21, June 2006.
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Multiple-Wavelength Lasers

Lasers that can simultaneously emit multiple wavelengths are in demand for telecommunications and other applications.
K. Poguntke, J. B. Soole, A. Scherer, H. P. LeBlanc, R. Bhat, and M. A. Koza, "Simultaneous multiple wavelength operation of a multiple array grating integrated cavity laser," Appl. Phys. Lett., vol. 62, pp. 2024-2026, Apr. 26, 1993.

Near-Field Optics Reading Heads

Higher densities of compact disk data storage can be achieved using

near-field optics.
T. D. Milster, "Near-field optics: A new tool for data storage," Proc. IEEE, vol. 88, pp. 1480-1490, Sept. 2000.

Neural Networks

Neural networks can recognize patterns and rout light signals accordingly.
C. C. Huang, B. K. Jenkins, and C. B. Kuznia, "Space-variant interconnections based on diffractive optical elements for neural networks: Architectures and cross-talk reduction," Appl. Opt., vol. 37, pp. 889-911, Feb. 10, 1998.

Nonlinear Quantum Well Waveguide Devices

Nonlinear effects may be induced in optical waveguides in quantum well structures. The resulting devices may be used for modulation and switching.
M. Saini and E. K. Sharma, "Analysis of nonlinear MQW waveguides: A simple numerical approach," IEEE Photon. Tech. Lett., vol. 8, pp. 384-386, Mar. 1996.

Optical Circulators

Optical circulators are needed in typical dispersion compensation in fiber networks.
M. Shirasaki, H. Kuwahara, and T. Obokata, "Compact polarization-independent optical circulator," Appl. Opt., vol. 20, pp. 2683-2688, Aug. 1, 1981.

Phase Contrast Microscopes

Transparent objects with refractive index of thickness variations can be imaged using phase contrast microscopy.
R. Liang, J. K. Erwin, and M. Mansuripur, "Variation on Zernike's phase-contrast microscope," Appl. Opt., vol. 39, pp. 2152-2158, May 1, 2000.

Photonic Crystal Fiber Lasers

Efficient fiber lasers can be produced at telecommunications wavelengths using photonic crystal fibers.
T. Sondergaard, "Photonic crystal distributed feedback fiber lasers with Bragg gratings," J. Lightwave Technol., vol. 18, pp. 589-597, Apr. 2000.

Photonic Crystal Lasers

Semiconductor lasers having feedback from a photonic crystal can be

constructed.
O. J. Painter, A. Husain, A. Scherer, J. D. O'Brien, I. Kim, and P. D. Dapkus, "Room temperature photonic crystal defect laser at near-infrared wavelength in InGaAsP," J. Lightwave Technol., vol. 17, pp. 2082-2088, Nov. 1999.

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The bit rate in modern fiber optic networks is commonly limited by polarization mode dispersion.
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Quantum Dot Detectors

Quantum dot detectors offer efficient infrared detection.
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Quantum Well Lasers

Quantum well lasers dominate the telecommunications market due to their ability to offer custom wavelengths through design.
M. J. Hamp and D. T. Cassidy, "Critical design parameters for engineering broadly tunable asymmetric multiple-quantum-well lasers," IEEE J. Quantum Electron., vol. 36, pp. 978-983, Aug. 2000.

Quantum Well Light-Emitting Diodes

Quantum well light-emitting diodes may become important in applications requiring custom wavelengths.
C. S. Chang, Y. K. Su, S. J. Chang, P. T. Chang, Y. R. Wu, K. H. Huang, and T. P. Chen, "High-brightness AlGaInP 573-nm light-emitting diode with a chirped multiquantum barrier," IEEE J. Quantum Electron., vol. 34, pp. 77-83, Jan. 1998.

Quantum Well Modulators

Semiconductor quantum well modulators can produce fast devices for telecommunications and other applications.
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Quantum Well Switches

Optically controlled fast switches are possible using semiconductor quantum devices.
P. LiKamWa and A. M. Kan'an, "Ultrafast all-optical switching in multiple-quantum-well y-junction waveguides at the band gap resonance," IEEE Selected Topics Quantum Electron., vol. 2, pp. 655-660, Sept. 1996.

Quantum Well Waveguide Modulators

Quantum well electroabsorption modulators offer an integration with other semiconductor components.
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Quantum Wire Lasers

Quantum wire lasers may offer a good combination of manufacturability and low threshold current in next-generation lasers.
T. G. Kim, X. L. Wang, Y. Suzuki, K. Komori, and M. Oruga, "Characteristics of the ground-state lasing operation in V-groove quantum-wire lasers," IEEE J. Selected Topics Quantum Electron., vol. 6, pp. 511-521, May-June 2000.

Range Finder Imaging Camera Systems

Imaging systems that can determine the range of objects are useful in three-dimensional television, in manufacturing and in other applications.
M. Kawakita, K. Iizuka, T. Aida, H. Kikuchi, H. Fujikake, J. Yonai, and K. Takizawa, "Axi-vision camera (real-time distance-mapping camera)," Appl. Opt., vol. 39, pp. 3931-3939, Aug. 1, 2000.

Red Blood Cells Optical Measurement Systems

To diagnose anemia, it is necessary to characterize the size and hemoglobin concentration of red blood cells.
K. A. Semyanov, P. A. Tarasov, J. T. Soini, A. K. Petrov, and V. P. Maltsev, "Calibration-free method to determie the size and hemoglobin concentration of individual red blood cells from light scattering," Appl. Opt., vol. 39, pp. 5884-5889, Nov. 1, 2000.

Resonant-Cavity Photodetectors

Photodetector performance can be improved by the addition of a resonant cavity around the active region.
H. H. Tung and C. P. Lee, "Design of a resonant-cavity-enhanced photodetector for high-speed applications," IEEE J. Quantum Electron., vol. 33, pp. 753-760, May 1997.

Solar Concentrators

To concentrate solar energy, an appropriately designed non-imaging optics are desirable.
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Soliton Propagation Communication Systems

Soliton pulses in fiber optic networks can propagate over long haul distances without exhibiting significant dispersion.
H. Toda, K. Mino, Y. Kodama, A. Hasegawa, and P. A. Andrekson, "Influence of noise in optical pulse source on soliton transmission," J. Lightwave Technol., vol. 17, pp. 1027-1031, June 1999.

Vertical Cavity Surface-Emitting Lasers

These semiconductor quantum well devices have the potential to dominate the future telecommunications market, both as pump lasers and as carrier wavelength lasers.
K. D. Choquette and H. Q. Hou, "Vertical-cavity surface emitting lasers: Moving from research to manufacturing," Proc. IEEE, vol. 85, pp. 1730-1739, Nov. 1997.

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Large quantities of data may be stored using volume holographic techniques.
F. H. Mok, "Angle-multiplexed storage of 5000 holograms in lithium niobate," Opt. Lett., vol. 18, pp. 915-917, June 1, 1993.

Wavelength Division Multiplexers

Wavelength division multiplexers are need in fiber network communications.
J. P. Lin and S. Thaniyavarn, "Four-channel Ti:LiNbO(3) wavelength division multiplexer for 1.3-um wavelength operation," Opt. Lett., vol. 16, pp. 473-475, Apr. 1, 1991.