Universitatea din București
Facultatea de Fizică
Departamentul de Structura materiei, Fizica atmosferei și a Pământului, Astrofizică

Tematică de concurs
pentru poziția 8 vacantă de Profesor universitar
din statul de funcții al DSMFAPA
Anul universitar 2018-2019

Subiecte

1). Filme subtiri polimere. Tehnici de depunere si proprietati fizice generale.
2). Polimerizarea in plasma. Caracteristici ale filmelor subtiri si parametrii fizici de control pentru depunere.
3). Introducere in fizica cristalelor lichide: stari de agregare, clasificare, proprietati generale si aplicatii tehnologice.
4). Tehnici de micro/nanolitografiere pentru filme subtiri polimere. Interactia cu materiale lichid cristaline si aliniamentul molecular superficial / in volum.
5). Dispozitive optice cu materiale lichid cristaline nematice (sisteme fluorescente si de tip LASER). Proprietati fizice si aplicatii.
6). Lasere organice DFB tunabile in lungime de unda din cristale lichide colesterice. Generalitati si aplicatii. Parametri fizici importanti ale acestor sisteme.
7). Afisaje cu materiale lichid cristaline (modul de functionare, proprietati fizice generale, avantaje si probleme tehnologice).
8). Metode fizice de investigare pentru filme subtiri polimere la scara micro/nanometrica.
9). Fenomene fizice de raspuns electro-optic in celule de cristale lichide nematice pentru aplicatii in industria afisajelor. Generalitati si parametri fizici importanti pentru sistem.
10). Metode de analiza pentru aliniamentul molecular in sisteme de cristale lichide (nematice/colesterice). Generalitati fizice si rezolutii posibile de atins.

Bibliografie selectiva
1. L. Georgescu, V. Popa-Nita, E. Barna si C. Berlic, Fizica cristalelor lichide (Ed. Univ. Buc. 2002)
2. P. G. De Gennes and J. Prost, The Physics of Liquid Crystals (Oxford Univ. Press, 1993)
3. C. Motoc, G. Iacobescu, Cristale lichide - proprietati fizice si aplicatii, Ed. Univ. Craiova (2004).
4. S. Chandrasekhar, Liquid Crystals, Cambridge University Press (1994).
5. Photonic Crystals: Molding the Flow of Light, John D. Joannopoulos, Robert D. Meade, & Joshua N. Winn, Princeton University Press (2008).
6. Handbook of microscopy for nanotechnology, Nan Yao. Zhong Lin Wang, Springer (2005).
7. Liquid Crystal Microlasers, Lev M. Blinov and Roberto Bartolino, Ed. Transworld Research Network, ISBN 978-81-7895-469-1, (2010).

8. Lili Vescan C, Handbook of thin film process technology, Bristol (UK), Institute of Physics, (1995).
9. N.P. Chermisinoff, Handbook of Polymer Science and Technology, Marcel Dekker, New York, (1989).
10. Topics in polymer physics, R.S. Stein, J. Powers, Imperial College Press, (2006).
11.L. M. Blinov, Electro-optical and magneto-optical properties of liquid crystals, New York: John Wiley & Sons Limited, (1983).

University of Bucharest,
Faculty of Physics
Department of Structure of matter, Earth and atmosphere Physics, Astrophysics

Subjects for concurs
Professor, position 8th
List of positions
Academic year 2018-2019

Topics

1). Thin polymer films. Modern techniques for deposition and generic physical properties.
2). Plasma polymerization. Thin films physical properties and control parameters for the deposition.
3). Introduction to liquid crystals: main states, classification, general properties and technological applications.
4). Micro/Nano lithography techniques for obtaining thin polymer films. Superficial and bulk interaction with liquid crystalline materials (alignment techniques).
5). Optical devices from nematic liquid crystalline materials (fluorescent and LASER type systems). Physical properties and applications.
6). Wavelength tunableDistributed Feedback (DFB) LASERSfrom chiral liquid crystals. Main physical properties and applications. Important physical parameters for this type of systems.
7). Liquid Crystal Displays (LCDs) – general physical properties, operation mode, application advantages and drawbacks of the technology.
8). Investigation techniques of thin polymer films at micro/nanometric scale.
9). Electro-optical response time and physical effects in nematic liquid crystalline cells for applications in the display industry. General aspects and important physical parameters for the system.
10). Investigation techniques for the molecular level alignment in liquid crystalline systems (nematic/cholesteric). Main physical aspects and maximum resolution levels.

Selective Bibliography

1. L. Georgescu, V. Popa-Nita, E. Barnasi C. Berlic, Fizicacristalelorlichide (Ed. Univ. Buc. 2002)
2. P. G. De Gennes and J. Prost, The Physics of Liquid Crystals (Oxford Univ. Press, 1993)
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