

Curriculum Vitae

Simion ASTILEAN, Professor

Babes - Bolyai University

Faculty of Physics, Dept. of Molecular Spectroscopy
and

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Personal data

Birth date: March 6, 1956, Cornesti, Romania

Marital status: married, 2 children

Nationality: Romanian

Education

1990-1993: *PhD in Physics*, “Joseph Fourier” University, Laboratoire de Spectrométrie Moléculaire, Grenoble, France

Thesis: *Transfert photoinduit de protons dans des cristaux mixtes pentacene/acide benzoique caractérisé par spectroscopie optique* (supervisor Dr H. P. Trommsdorff)

1980-1981: *MSc. in Physics*, Faculty of Physics, “Babes-Bolyai” University, Cluj, Romania

1976-1980: *BSc in Physics*, Faculty of Physics, “Babes-Bolyai” University, Cluj, Romania

Academic Positions

2003-: *Professor*, Head of Molecular Spectroscopy Dept. and Nanobiophotonics Center. Faculty of Physics, Babes-Bolyai University, Cluj-Napoca, Romania;

1996 – 2002: *Associate Professor* Babes-Bolyai University, Cluj-Napoca, Romania.

1994 - 1996: *Lecturer*, Babes-Bolyai University, Cluj-Napoca, Romania.
 1986 - 1994: *Assistant Professor*, Babes-Bolyai University, Cluj-Napoca, Romania.

Academic Achievements:

- Author or co-author of more than 85 scientific articles published in international referred journals (ISI) with over 600 citations (h-index = 14) and more than 20 international conference proceedings (see list of publications).
- Co-author of a book published by Springer Verlag (see list of publications)
- Contributor of chapters in 2 international books (see list of publications).
- Author and co-author of 3 books published in Romanian.
- Invited speaker in 7 International Conferences and Universities.
- Director and researcher-in-charge for 6 national funded projects.
- Supervision of 5 PhD theses (defended) and 2 enrolled in international join program

Current Research Activities

Nanobiophotonics

- a) Design, fabrication and characterization of noble-metal, polymer and hybrid nanostructures.
- b) Functionalization of noble-metal nanoparticles for biomedical applications (cell imaging, biosensing, diagnostic and therapy).
- c) Development of ultrasensitive methods for molecular spectroscopy (surface-enhanced Raman spectroscopy (SERS), surface-enhanced IR absorption (SEIRA), local surface plasmon resonance (LSPR) and metal-enhanced fluorescence (SEF)).

Research Competences

- Optical spectroscopy* (confocal Raman microscopy, FT-Raman, SERS, FT-IR, steady-state and time-resolved fluorescence, UV-VIS electronic spectroscopy, dark-field microscopy, ‘hole-burning’ optical spectroscopy, etc)
- Methods of nanofabrication and characterization* (chemical synthesis of noble metal nanoparticles, colloidal self-assembly, nanosphere lithography, thin film deposition, plasma cleaning and etching, reactive ion etching; surface activation and functionalization; spin-coating; atomic force microscopy, electron microscopy, etc)
- Methods of simulation in optics and photonics* (RCWA-rigorous coupled wave analysis, DDA-discrete dipole approximation, FDTD-finite-difference time-domain).

Visiting Scientist

1-30.06 /2007, University „Denis Diderot” Paris VII, Paris (invited professor)

Project: *Plasmonic nanostructures for Surface-Enhanced Vibrational Spectroscopy* (Ref. Prof Jean Aubard)

1/06-31/06 (2006): Laboratoire d’Etudes des Propriétés Electroniques des Solides, CNRS, Grenoble, France (invited professor)

- Project: *Designing new experiments for single-molecule optical detection* (Ref : Dr Tomas-Lopez Rios)
- 1/06-30/08 (2003): University Joseph Fourier, Laboratoire de Spectrométrie Physique, Grenoble, France (invited professor)
- Project: *Photoinduced structural modifications in organic crystals* (Ref: Prof. Roger Casalegno)
- 1/01 (2001) – 31/12 (2002): University of Exeter, Photonics Group, UK (visiting scientist)
- Project: *Photonic control of light-molecule interactions.*(Prof WL Barnes)
- 1/01-31/12 (2000): The Weizmann Institut of Science, Rehovot, Israel (visiting scientist)
- Project: *Single-molecule detection by Raman and fluorescence spectroscopy* (Ref: Dr Gilad Haran)
- 01/02-31/11 (1997): Institut d'Optique Theorique et Appliquee, Paris, France (post-doc researcher)
- Project: *Design and fabrication of periodically nanostructured films for diffractive elements* (Ref: Dr. Philippe Lalanne)

Fellowships and Awards

- NATO post-doctoral fellowship (1997, Institut of Optics, Paris)
- “Constantin Miculescu” award of Romanian Academy (1990)
- “Babes-Bolyai University” Diploma of Scientific Excellence (2004, 2008)

Scientific societies

Romanian Society of Physics
 European Physical Society
 Société Française d'Optique
 SPIE

Other academic activities

Head of Molecular Spectroscopy Department (Faculty of Physics)
 Director of Nanobiophotonics Center (Institute of Interdisciplinary Research in BioNanoSciences)
 Director of Nanosciences and Nanotechnologies Consortium at Babes-Bolyai University;
 Reviewer for the journals: Phys Rev Lett, J Phys Chem, Nanoscale, Nanotechnology, J Raman Spectroscopy, Vibrational Spectroscopy, J Optoelect. and Advanced Materials, Rom J of Physics, Studia UBB, etc.
 Co-organiser of two international conferences (Advanced Spectroscopies on Biomedical and Nanostructured Systems, Cluj-Napoca, 2004 and 2006).

Languages

Romanian (mother language)
 English
 French

Selected Publications

- 71.** Detoxification of gold nanorods by conjugation with thiolated poly(ethylene glycol) and their assessment as SERS-active carriers of Raman tags
S. Boca, S. Astilean,
Nanotechnology Vol 21 p 235601 (8pp) 2010
- 70.** Mapping the SERS Efficiency and Hot-Spots Localization on Gold Film over Nanospheres Substrates,
Cosmin Farcau and Simion Astilean,
J. Phys. Chem. C 2010, 114, 11717–11722
- 69.** Study of the interaction between CdSe/ZnS core-shell quantum dots and bovine serum albumin by spectroscopic techniques,
Milohum Mikesokpo Dzagli, Valentin Canpeana, Monica Iosin, Messanh Agbeko Mohou, Simion Astilean
Journal of Photochemistry and Photobiology A: Chemistry 215 (2010) 118–122
- 68.** Laser microstructuring of three-dimensional enzyme reactors in microfluidic channels
Monica Iosin, Teodora Scheul, Clement Nizak, Olivier Stephan, Simion Astilean, Patrice Baldeck,
Microfluidics & Nanofluidics DOI 10.1007/s10404-010-0698-9 (2010)
- 67.** Study of tryptophan assisted synthesis of gold nanoparticles
by combining UV–Vis, fluorescence, and SERS spectroscopy,
Monica Iosin, Patrice Baldeck, Simion Astilean,
J Nanoparticle Research DOI 10.1007/s11051-010-9869-6 (2010)
- 66.** Uptake and biological effects of chitosan-capped gold nanoparticles on Chinese Hamster Ovary cells,
Sanda C. Boca, Monica Potara, Felicia Toderas, Olivier Stephan, Patrice L. Baldeck and Simion Astilean,
Materials Science and Engineering: C, DOI:10.1016/j.msec.2010.08.015 (2010)
- 65.** Disentangling SERS Signals from Two Molecular Species: A New Evidence for the Production of p,p'-Dimercaptoazobenzene by Catalytic Coupling Reaction of p-Aminothiophenol on Metallic Nanostructures
V. Canpean, M. Iosin and S. Astilean,
Chemical Physics Letters DOI:10.1016/j.cplett.2010.10.006 (2010)
- 64.** Multifunctional plasmonic sensors on low-cost subwavelength metallic nanoholes arrays,
Canpean, V; Astilean, S,
LAB CHIP 9 (2009) 3574-3579.
- 63.** Silver half-shell arrays with controlled plasmonic response for fluorescence enhancement optimization,
Farcau, C; Astilean, S,
APPL PHYS LETT 95 193110 (2009)
- 62.** Extending nanosphere lithography for the fabrication of periodic arrays of subwavelength metallic nanoholes
Canpean, V; Astilean, S,
MATER LETT 63 (2009) 2520-2522.
- 61.** Convective assembly of two-dimensional nanosphere lithographic masks,

- Canpean, V; Astilean, S; Petrisor, T; Gabor, M; Ciascai, I,
MATER LETT 63 (2009) 1834-1836.
- 60.** The synthesis of biocompatible and SERS-active gold nanoparticles using chitosan,
Potara, M; Maniu, D; Astilean, S,
NANOTECHNOLOGY 20 315602 (2009)
- 59.** Study of protein-gold nanoparticle conjugates by fluorescence and surface-enhanced Raman scattering
Iosin, M; Toderas, F; Baldeck, PL; Astilean, S,
J MOL STRUCT 924-26 (2009) 196-200.
- 58.** Multilayer Structures of Self-Assembled Gold Nanoparticles as a Unique SERS and SEIRA Substrate
Baia, M; Toderas, F; Baia, L; Maniu, D; Astilean, S,
CHEMPHYSICHEM 10 (2009) 1106-1111.
- 57.** An ethylene-glycol decorated ruthenium(II) complex for two-photon photodynamic therapy
Boca, SC; Four, M; Bonne, A; van der Sanden, B; Astilean, S; Baldeck, P; Lemercier, G.,
CHEM COMMUN 30 (2009) 4590-4592.
- 56.** The study of Raman enhancement efficiency as function of nanoparticle size and shape
Boca, SC; Farcau, C; Astilean, S.
NUCL INSTRUM METH B 267 (2009) 406-411.
- 55.** Plasmon-enhanced fluorescence of dye molecules
Iosin, M; Baldeck, P; Astilean, S,
NUCL INSTRUM METH B 267 (2009) 403-405.
- 54.** Disorder effects in reflectance spectra of colloidal photonic crystals
Vinteler, E; Farcau, C; Astilean, S, ,
NUCL INSTRUM METH B 267 (2009) 393-396.
- 53.** Interaction of light with metallic nanohole arrays,
Canpean, V; Astilean, S,
NUCL INSTRUM METH B 267 (2009) 397-399.
- 52.** Luminescence properties of gold nanorods,
Toderas, F; Losin, M; Astilean, S,
NUCL INSTRUM METH B 267 (2009) 400-402.
- 51.** Bridging biomolecules with nanoparticles: surface-enhanced Raman scattering from colon carcinoma and normal tissue
Pinzaru, SC; Andronie, LM; Domsa, I; Cozar, O; Astilean, S,
J RAMAN SPECTROSC 39 (2008) 331-334.
- 50.** Periodically nanostructured noble-metal thin films with enhanced optical properties
Farcau, C; Canpean, V; Gabor, M; Petrisor, T; Astilean, S,
J OPTOELECTRON ADV MATER 10 (2008) 809-812.
- 49.** Raman investigation of some polymeric gels of pharmaceutical interest,
Todica, M; Dinte, E; Pop, CV; Farcau, C; Astilean, S, #
J OPTOELECTRON ADV MATER 10 (2008) 823-825.
- 48.** Tuning the plasmon resonances of gold nanoparticles by controlling their size and shape
Toderas, F; Baia, M; Maniu, D; Astilean, S,
J OPTOELECTRON ADV MATER 10 (2008) 2282-2284.
- 47.** In Vitro biosynthesis of gold nanotriangles for Surface-Enhanced Raman spectroscopy,
Iosin, M; Toderas, F; Baldeck, P; Astilean, S,
J OPTOELECTRON ADV MATER 10 (2008) 2285-2288.
- 46.** Designing the colour of photonic crystals for sensors applications,
Vinteler, E; Farcau, C; Astilean, S,
J OPTOELECTRON ADV MATER 10 (2008) 2298-2302.

45. Ultrasound-assisted synthesis of highly disperse zinc sulphide powders
Tomsa, R; Popovici, EJ; Cadis, AI; Stefan, M; Barbu-Tudoran, L; Astilean, S, J
OPTOELECTRON ADV MATER 10 (2008) 2342-2345.
44. Experimental and theoretical investigation of optical properties of colloidal photonic crystal films
Farcau, C; Vinteler, E; Astilean, S,
J OPTOELECTRON ADV MATER 10 (2008) 3165-3168.
43. Tuning of gold nanoparticles plasmon resonances by experiment and simulation
Toderas, F; Baia, M; Farcau, V; Astilean, S; Ulinici, S,
J OPTOELECTRON ADV MATER 10 (2008) 3265-3269.
42. Noble-metal nanostructures for controlling surface plasmons and sensing molecules,
S. Astilean,
Radiation Physics and Chemistry, Vol 76, 436-440 (2007).
41. Controlling Gold Nanoparticle Assemblies for Efficient Surface Enhanced Raman Scattering (SERS) and Localized Surface Plasmon Resonance (LSPR) Sensors
Felicia Toderas, Monica Baia, Lucian Baia and Simion Astilean,
Nanotechnology Vol. 18, (25), 255702, (2007).
40. Self-assembled multilayers of gold nanoparticles as versatile platforms for molecular sensing by Fourier transform-surface enhanced scattering (FT-SERS) and surface enhanced infrared absorption (SEIRA)
F. Toderas, S. Boca, M. Baia, L. Baia, D. Maniu, S. Astilean, S. Simon
J. Optoelectron. Adv. Mater., Vol. 9, No. 3, 625 – 628 (2007)
39. Probing the unusual optical transmission of silver films deposited on two-dimensional regular arrays of polystyrene microspheres,
C Farcau and S Astilean
J. Opt. A: Pure Appl. Opt. 9 S345–S349 (2007)
38. Controlled deposition of photonic polystyrene-nanosphere films,
Kuttesch A., Farcau C., Neda Z., Astilean S.,
Proceedings of SPIE - The International Society for Optical Engineering, Vol 6785 , 34229 (2007)
37. Interplay between photonic and plasmonic modes in optical properties of silver-coated two dimensional colloidal crystals,
Farcau C., Kuttesch A., Petrisor T., Barbu-Todoran L., Craciun C., Astilean S,
Proceedings of SPIE - The International Society for Optical Engineering, Vol 6785 , 34278 (2007).
36. Surface-Enhanced-Raman-Spectroscopy (SERS) of truncated tetrahedral Ag nanoparticles arrays mediated by electromagnetic coupling,
M. Baia, L.Baia, J.Popp, S. Astilean,
Applied Physics Letters, 88, pag 143121-143123 (2006).
35. Probing the enhancement mechanisms of SERS with p-aminothiophenol molecules adsorbed on self-assembled gold colloidal nanoparticles,
M. Baia, F. Toderas, L. Baia, J. Popp, S. Astilean,
Chemical Physics Letters 422 pag. 127–132 (2006)
34. Gold films deposited over regular arrays of polystyrene nanospheres as highly effective SERS substrates from visible to NIR,

- L. Baia, M. Baia, J. Popp, S. Astilean
Journal of Physical Chemistry B 110, 23982 (2006).
- 33.** Optical properties of metallic nanostructures fabricated by two-photon induced photoreduction (invited paper),
Nicoletta Tosa, Jocelyne Bosson, Marc Pierre, Christophe Rambaud, Michel Bouriau, Guy Vitrant, Olivier Stephan, Simion Astilean, Patrice L Baldeck, *Nanophotonics*, Editor(s): David L. Andrews, Jean-Michel Nunzi, Andreas Ostendorf Proceedings of SPIE Volume: 6195, pag 1-9 (2006)
- 32.** Spring-block type models for capillarity-driven self-organized nanostructures,
F. Jarai-Szabo, A. Kuttesch, S. Astilean, Z. Neda, N. Chakrapami, P.M. Ajayan, R. Vajtai,
J.of Optoe. and Adv. Materials, Vol. 8, No. 3, 1083-1087 (2006).
- 31.** Two-photon fabrication of metallic nanowires for plasmonics
Bosson-Ehoomann J., Mihut A., Tosa N., Astilean S., Pierre M., Rambaud C., Vurth L., Baldeck P.L.,
Nonlinear Optics Quantum Optics, Vol 35 (2006) 1-3.
- 30.** Understanding self-assembled nanosphere patterns
Ferenc Jarai-Szabo, Simion Astilean, and Zoltan Neda
Chemical Physics Letters, Vol 408, 241-246 (2005),
- 29.** Gold nanostructured films deposited on polystyrene colloidal crystal templates for surface-enhanced Raman spectroscopy
M. Baia , L. Baia, S. Astilean
Chemical Physics Letters Vol 404, 3–8 (2005)
- 28.** The transition from localized surface plasmon resonance to extended surface plasmon-polariton as metallic nanoparticles merge to form a periodic hole-array
W. A. Murray, S. Astilean, and W. L. Barnes
Phys Rev B 69, 165407, 2004
- 27.** Controlling the fluorescence lifetime of dyes in nanostructured geometries,
S. Astilean, S. Garrett, P. Andrew, and W.L. Barnes,
J. Molecular Structure, Vol 651-653, 277-283 (2003)
- 26.** Quantum efficiency and the photonic control of molecular fluorescence in the solid state
S. Astilean and W. L. Barnes,
Applied Physics B, 75, 1-4, (2002)
- 25.** Surface-enhanced Raman scattering study of silver deposition on thin Alq₃ layers,
G. Salvan, Y. Sakurai, A. Yu., Kobitski, R. Scholz, S. Astilean, T.U. Kampen, D.R.T. Zahn, H. Ishii, and K. Seki,
Applied Surface Science, 190, 371–375 (2002).
- 24.** Microenvironmental investigation of polymer-bound fluorescent chelator by fluorescence microscopy and optical spectroscopy,
Y. Wang, S. Astilean, G. Haran, and A. Warshawsky,
Anal. Chem., 73, 4096-4103 (2001)
- 23.** Light transmission through metallic channels much smaller than the wavelength
S. Astilean, Ph. Lalanne, and M. Palamaru,
Optics Communication, 175 (4-6), 265-273, (2000).
- 22.** One-mode model and Airy-like formulae for one-dimensional metallic gratings,

- P. Lalanne, J. P. Hugonin S. Astilean, M. Palamaru and K. D. Moller,
J Pure and Applied Optics, 2, 48-51 (2000).
- 21.** 1,4-Benzodiazepine drugs adsorption on the Ag colloidal surface,
S. Cinta, T. Iliescu, S. Astilean, L. David, O. Cozar and, W. Kiefer,
J. Mol Struct., 482-483, 685-688, (1999).
- 20.** Design and fabrication of blazed-binary diffractive elements with sampling periods smaller than the structural cutoff,
Ph. Lalanne, S. Astilean, P. Chavel, E. Cambriil and H. Launois,
J. Opt. Soc Am. A, 16, 1143-1156, (1999).
- 19.** Sub-wavelength metallic gratings of very high transmission efficiency,
M. Palamaru and S. Astilean,
Journal of Optoelectronics and Advanced Materials, 1 (2), 35-40 (1999).
- 18.** Blazed-binary subwavelength gratings with efficiencies larger than those of conventional blazed gratings,
Ph. Lalanne, S. Astilean, P. Chavel, E. Cambriil. and H. Launois,
Optics. Letters. 23, 1081-1083 (1998).
- 17.** High efficiency subwavelength diffractive element patterned in a high-refractive-index material for 633 nm operation,
S. Astilean, Ph. Lalanne, P. Chavel, E. Cambriil. and H. Launois,
Optics Letters 23, 552 -554 (1998) .
- 16.** FT-IR and X-ray spectroscopic investigations of Na-diclofenac-cyclodextrins interactions,
Bratu, S. Astilean, Corina Ionescu, E. Indrea, J.P. Huvenne and P. Legrand·
Spectrochimica Acta, Part A, 54, 191-196, (1998).
- 15.** A new graphic-code for computer generated hologram,
M. Giloan and S. Astilean,
Optics Communications, 139, 7-10 (1997).
- 14.** NMR Spectroscopy of inclusion complex of sodium diclofenac with beta-cyclodextrin in aqueous solution,
S. Astilean, Corina Ionescu, Gh. Cristea, S. I. Farcas, I. Bratu and R. Vitoc
Biospectroscopy, 3 (2), 233-239 (1997). (transformata in Biopolymers)
- 13.** pH influence on the Raman spectra of PP Vitamin in solution and on silver sol,
T. Iliescu, S. Cinta, S. Astilean, and I. Bratu,
Journal of Molecular Structure, 410-411, 193-196 (1997)
- 28.** Vibrational and rotational relaxation of $\nu(\text{C-Br})$ mode of 2-bromopropane,
T. Iliescu, S. Astilean, I. Bratu, R. Grecu and D. Maniu;
J. Chem. Soc. Faraday Trans., 2, 92-96, (1996)
- 12.** Raman study of 9-methylacridine adsorbed on silver sol,
T. Iliescu, V. Vlassa, M. Caragiu, M. Marian, and S. Astilean;
Vibrational Spectroscopy, 8, 451-456, (1995).
- 11.** Pathway of spontaneous and photoinduced hydrogen tunneling in organic crystals,
R. Casalegno, S. Astilean, A. Corval and H.P. Trommsdorff,
J. Photochem. Photobiol. A: Chem., 80, 351-352, (1994).
- 10.** Photoinduced proton disorder in pentacene doped benzoic acid crystals: A model system for holeburning in glasses,
S. Astilean, A. Corval, R. Casalegno and, H.P. Trommsdorff,

- J. Luminescence, 62, 245 (1994).
9. Resonant intersystem crossing in pentacene,
A. Corval, C. Kryschi, S. Astilean, and H.P. Trommsdorff,
J. Phys. Chem. 98, 7376-81 (1994).
 8. Relaxation and photochemistry in pentacene doped benzoic acid crystals,
S. Astilean, A. Corval, R. Casalegno and, H.P. Trommsdorff,
J. Luminescence, 58 (1-6), 275-278, (1994).
 7. Singlet - triplet level crossing in matrix isolated pentacene,
S. Astilean, V. Chitta, A. Corval, R.J.D. Miller, and H.P. Trommsdorff,
Chem. Phys. Lett., 219, 95-100, (1994).
 6. Proton motions and holeburning mechanisms in molecular solids,
H. Peter Trommsdorff, S. Astilean, R. Casalegno, and A. Corval,
Mol. Cryst. Liquid. Cryst., 236, 21-28 (1993).
 5. Deuteration effect on photoinduced hydrogen motions in low temperature mixed
molecular crystals,
R. Casalegno, A. Corval, S. Astilean, and H.P. Trommsdorff,
J. Luminiscence 53, 211 - 214 (1992).
 4. Deuteration of pentacene in benzoic acid: monitoring the reaction kinetics via low
temperature optical spectroscopy,
A. Corval, R. Casalegno, S. Astilean, and H.P. Trommsdorff,
J. Phys. Chem. 96, 5393 - 5395 (1992).
 3. Laser induced hydrogen motions in organic crystals at low temperatures,
S. Astilean, R. Casalegno, A. Corval, and H.P. Trommsdorff,
J. Physique IV, 1 C7, 451-454 (1991).
 2. Isotopic substitution effects on molecular relaxation of dimethylsulfoxide in pure
liquid and different media,
I. Bratu, K. Klosterman, T. Iliescu, and S. Astilean,
Journal of Molecular Liquids 45, 57-63, (1990).
 1. Raman study of vibrational relaxation of dimethylsulfoxide in solutions,
T. Iliescu, S. Astilean, and I. Bratu,
Journal of Molecular Liquids 47, 129-137, (1990).

International Books

1. Raman and SERS investigation of pharmaceuticals,
M. Baia, S. Astilean, T. Iliescu,
Springer-Verlag, Berlin Heidelberg, 2008.

Contributed Chapters in International books

1. S. Astilean, Ph. Lalanne, P. Chavel, E. Cambril and H. Launois, 2001,
High efficiency subwavelength diffractive element patterned in a high-refractive-index
material for 633 nm operation, in *Subwavelength Diffractive Optics*, Milestone Series in
Optics, Joseph N. Mait and Dennis W. Prather, Editors: SPIE press, The International
Society for Optical Engineering, Bellingham, SUA, 422-426, ISBN 0-8194-4049-3
2. Ph. Lalanne, S. Astilean, P. Chavel, E. Cambril. and H. Launois, 2001,
Blazed-binary subwavelength gratings with efficiencies larger than those of conventional
blazed gratings, in *Subwavelength Diffractive Optics*, Milestone Series in Optics, Joseph

N. Mait and Dennis W. Prather, Editors: SPIE press, The International Society for Optical Engineering, Bellingham, SUA, 426-430, ISBN 0-8194-4049-3

Books published in Romania

1. Aplicatii ale spectroscopiei vibrationale,

Traian Iliescu, Simona Cinta-Pinzaru, Dana Maniu, Rodica Grecu, Simion Astilean,

Editura Casa Cartii de Stiinta, Cluj-Napoca, (2002).
ISBN 973-686-292-5.

2. Metode si tehnici moderne de spectroscopie optica, Vol I: *Spectroscopia IR si Raman*,
Simion Astilean,

Editura Casa Cartii de Stiinta, Cluj-Napoca, (2002).
ISBN 973-686-333-6.

Simion Astilean

8/11 / 2010 Cluj-Napoca