CURRICULUM VITAE

PERSONAL

Family name	Marhaba
Name	Salem
Date of birth	09/09/1980
Place of birth	Tripoli – Lebanon
Marital status	married, 4 children
Nationality	Lebanese, French
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CURRENT POSITION

Sep. 15 – Present

- Associate Professor
- Beirut Arab University – Faculty of Science – Department of Physics
  Tripoli – Lebanon
- Email: s.marhaba@bau.edu.lb

EMPLOYMENT

Feb. 11 – Aug. 15
- Assistant Professor – Beirut Arab University – Faculty of Science – Department of Physics – Tripoli – Lebanon

Sep. 09 – Aug. 10
- Assistant professor – University of Littoral – Dunkerque – France
  Thermo-Physics Laboratory of Condensed Matter (LTPMC)

Sep. 08 – Aug. 09
- Assistant professor –University of Paris VI – Paris – France
  NanoSciences Institute of Paris (INSP)

DOCTORAL STUDIES

Sep. 05 – Aug. 08

- **Ph.D in Physics**
  - Laboratory of Molecular and Ionic spectrometry (LASIM)
    Claude Bernard University – Lyon – France
    - Thesis: "Influence of the morphology on the optical properties of single metallic nano-objects"
    - Supervisor: Mr. Michel Pellarin
  - Grant: National Ministry of higher education and Research-France

GRADUATE STUDIES

Sep. 04 – Aug. 05

- **Master of Physics and Technology**
  - Laboratory of Molecular and Ionic spectrometry (LASIM)
    Claude Bernard University – Lyon – France
    - Thesis: "Description and implementation of a new device to deposit size-selected clusters"
    - Supervisor: Mr. Michel Broyer

TEACHING COURSES	
Sep. 08 – Feb. 25	**Undergraduate courses:** Introduction to Physics, General Physics, Physical Optics, Thermal Physics, Classical Mechanics and Waves, Modern Physics, Electromagnetism, Quantum Physics I, Mathematical Methods for Physics, Relativity, Quantum Physics II, Electrodynamics, Solid State Physics, Statistical Physics, Biophysics, Computational Physics, Astrophysics, Electronics, Circuit Analysis. **Graduate courses:** Advanced Classical Mechanics, Research Techniques, Materials Science, Selected Topics in Nanoscience and Nanotechnology. **University Elective courses:** Physics for Every Day Life, Introduction to Astronomy, Scientific Thinking.

RESEARCH INTERESTS

My research interests are in the area of plasmonic metal nanostructures, from a single nanoparticle to ensembles. In particular, the metallic nanoparticles display potential for such applications as enhancing the fluorescence of biological molecules. The optical properties of noble and transition metals nanoparticles are dominated by their localized surface plasmon resonance (LSPR), which is known to closely depend on the size, shape and dielectric environment of the particle, and also on their chemical composition in the case of composite systems. In order to study the optical response of a single, dimer or well organized nanoparticles, we used a sensitive spectroscopic technique in far field. This technique enables the absolute extinction cross-section of the nanostructure to be determined. In the case of single nanoparticles, we can obtain from the measured optical response the quantitative information on their size, shape and environment. In the case of agglomerated nanoparticles (from dimer, to chain), we used direct observation of the nanostructures by Transmission Electron Microscopy (TEM). The coupling of optical technique with TEM images turns out to be essential to get an unambiguous description of their optical response in relation with their exact morphologies and interparticle distances. The measured optical response of nanostructure is compared with that computed by Finite Element Method (FEM) implanted in COMSOL multiphysics.

SUPERVISION DUTIES

Mar. 09 –July 09	**Alexandros Mouskeftaras (Master):** *Nano light heat converters and applications*
Oct. 11 – Oct. 13	**Roaa Yassin (Master):** *Influence of the size on the optical properties of bimetallic nanoparticles*
Jan. 12 – June 13	**Hiba Miari (Master):** *Size and shape effects on the optical properties of silver nanoparticles*
June 13- Jan. 16	**Hadi Basma (Ph.D.):** *Ion Beam Analysis and Magnetic Properties of High Temperature Superconductor Samples Added with Nano Ferrite*

June 14- Nov. 15	**Majed Sharrouf (Master)**: *Preparation and characterization of magnetic diluted semiconductor samples*
July 19 – July 22	**Samaya El Samad (Ph.D.):** *Surface Plasmon Resonance of Single or Assembled Noble and Transition Metals Nanoparticles*
Sep. 21 - June 22	**Nourhan El Kawni (Master):** *Size and Shape Effect on the Localized Surface Plasmon Resonance of Palladium Nanoparticles*
Mar. 22 – Feb. 25	**Ahmad Zeid (Master):** *Optical Properties of palladium-gold and gold-palladium bimetallic core-shell nanoparticles*
June 22 – Apr. 25	**Mohammed Khalaf (Master):** *Morphological Effects on the Optical Properties of Palladium nanoparticles*
Nov. 22 - Present	**Farah Fattouh (Ph.D.):** *Plasmonic Coupling of Well Organized Metal NanoStructure.*
Nov. 22 - Present	**Mohammad Abou Ghouch (Ph.D.):** *Light Polarization Effects on The Localized Surface Plasmon Resonance of Metallic Nanostructures*

PUBLICATIONS

1) « *A Novel Approach for Time-Local Fractional Solutions of Certain Nonlinear Partial Differential Equations in Fractal Dimension* » M Jneid, M Daher, M Awad, S Marhaba **International Journal of Analysis and Applications** 22 207 (2024)
2) « *Size effect on the Optical Response of Cylindrical Palladium Nanoparticles* » S Marhaba, M Khalaf **BAU Journal-Science and Technology** 4 2 (2023)
3) « *Localized Surface Plasmon Resonance of Palladium Parallelepiped Nanoparticles* » S Marhaba, N El Kawni **BAU Journal-Science and Technology** 4 2 (2023)
4) « *How Light Polarizations Affect the Localized Surface Plasmon Resonance of Asymmetric Palladium Nanostructures* » S El Samad, S Marhaba **Nano** 17 2250051 (2022)
5) « *Localized Surface Plasmon Resonance of Copper Nanoparticles Using Finite Element Method*» S El Samad, S Marhaba **BAU Journal-Science and Technology** 3 2 (2022)
6) « *Interparticle Distance Effect on the Optical Response of Platinum Dimer Nanoparticles* » S Marhaba, SE Samad **Chemistry Africa** 4 477 (2021)
7) « *Plasmonic Coupling of One-Dimensional Palladium Nanoparticle Chains* » S Marhaba, SE Samad **Nano** 15 2050060 (2020)
8) « *A comparative study on the influence of the addition of different nano-oxide particles on the thermopower of (Bi, Pb)-2223 superconductor* » HT Rahal, R Awad, AM Abdel-Gaber, S Marhaba, AI Abou-Aly **Applied Physics A** 125 365 (2019)
9) « *Thermoelectric power of (Cu0. 5Tl0. 5)-1223 superconducting phase added with BaSnO3 nanoparticles* » A Srour, W Malaeb, S Marhaba, R Awad **Journal of Physics: Conference Series** 869 012017 (2017)
10) « *Effect of Size, Shape and Environment on the Optical Response of Metallic Nanoparticles* » S. Marhaba **IntechOpen** Book chapter London (2017)
11) « *Electrical and mechanical properties of (Bi,Pb)-2223 substituted by holmium* » W. Abdeen, S. Marhaba, R. Awad, A. I. Abou Aly, I. H. Ibrahim, M. Matar **Journal of Advanced Ceramics** 5 54 (2016)
12) « *Structural, Optical and Room Temperature Magnetic Study of Mn-Doped ZnO Nanoparticles* » M. Sharrouf, R. Awad, S. Marhaba, D.E. Bakeer **Nano** 11 1650042 (2016)
13) « *Study of the Irreversibility Line of $GdBa_2Cu_3O_{7-\delta}$ Added with Nanosized Ferrite $CoFe_2O_4$* » H. Basma, R. Awad, M. Roumie, S. Isber, S. Marhaba, A. I. Abou Aly **Journal of Superconductivity and Novel Magnetism** 29 179 (2016)

14)« *Ion Beam Analysis and Electric Properties of $GdBa_2Cu_3O_{7-\delta}$ Added with Nanosized Ferrites $ZnFe_2O_4$ and $CoFe_2O_4$* » H. Basma, M. Roumié, R. Awad, S. Marhaba, M. Albast, A. Abualy **Materials Sciences and Applications** 6 828 (2015)

15)« *Structural, Optical and Room Temperature Magnetic Study of Mn_2O_3 Nanoparticles* » M. Sharrouf, R. Awad, M. Roumié, S. Marhaba **Materials Sciences and Applications** 5 850 (2015)

16)« *Gold Nanoparticle Arrays Spectroscopy: Observation Of Electrostatic And Radiative Dipole Interactions* » S. Marhaba **Nano** 10 1550007 (2015)

17)« *Investigation of Temperature Dependence of the Irreversibility Line of $GdBa_2Cu_3O_{7-\delta}$ Added with Nanosized Ferrite $ZnFe_2O_4$* » R. Awad, M. Roumié, S. Isber, S. Marhaba, A. I. AbouAly, H. Basma **Journal of Superconductivity and Novel Magnetism** 28 535 (2015)

18)« *Improvement of superconducting parameters of $Bi_{1.8}Pb_{0.4}Sr_2Ca_2Cu_3O_{10+\delta}$ added with nano-Ag* » R. Mawassi, S. Marhaba, M. Roumié, R. Awad, M. Kork and I. Hassan **Journal of Superconductivity and Novel Magnetism** 27 1131 (2014)

19)« *Effect of Fe_2O_3 Nano-Oxide Addition on the Superconducting Properties of the (Bi,Pb)-2223 Phase*» M. Roumié, S. Marhaba, R. Awad, M. Kork, I. Hassan, R. Mawassi **Journal of Superconductivity and Novel Magnetism** 27 143 (2014)

20)« *Absolute optical extinction measurements of single nano-objects by Spatial Modulation Spectroscopy using a white lamp*» P. Billaud, S. Marhaba, N. Grillet, E. Cottancin, C. Bonnet, J. Lermé, N. Del Fatti, F. Vallée, J. L. Vialle, M. Broyer, and M. Pellarin **Review of Scientific Instruments** 81 043101 (2010)

21)« *Linear optical properties of single metallic nanoparticles* » S. Marhaba **European academic editions** Berlin (2010)

22)« *Quantitative size dependence of the surface plasmon resonance damping in single Ag@SiO2 nanoparticles* » H. Baida, P. Billaud, S. Marhaba, D. Christofilos, E. Cottancin, A. Crut, J. Lermé, P. Maioli, M. Pellarin, M. Broyer, N. Del Fatti and F. Vallée; A. Sánchez-Iglesias, I. Pastoriza-Santos and L.M. Liz-Marzán **Nano-Letters** 9 3463–3469 (2009)

23)« *Surface plasmon resonance of single gold nanoparticle pairs near the conductive contact limit* » S. Marhaba, G. Bachelier, C. Bonnet, M. Broyer, E. Cottancin, N. Grillet, J. Lermé, J. L. Vialle, and M. Pellarin **Journal of Physical Chemistry C** 113 4349-4356 (2009)

24)« *Optical response of metal or dielectric nano-objects in strongly convergent light beams* » J. Lermé, C. Bonnet, M. Broyer, E. Cottancin, S. Marhaba, and M. Pellarin **Physical Review B** 77 245406 (2008)

25)« *Optical response of a single spherical particle in a tightly focused light beam: application to the spatial modulation spectroscopy technique* » J. Lermé, G. Bachelier, P. Billaud, C. Bonnet, M. Broyer, E. Cottancin, S. Marhaba, and M. Pellarin **Journal of the Optical Society of America A** 25 493-514 (2008)

26)« *Correlation between the extinction spectrum of a single metal nanoparticle and its electron microscopy image* » P. Billaud, S. Marhaba, E. Cottancin, L. Arnaud, G. Bachelier, C. Bonnet, N. Del Fatti, J. Lermé, F. Vallée, J. L. Vialle, M. Broyer, and M. Pellarin **Journal of Physical Chemistry C** 112 978-982 (2008)

27)« *Organization of size-selected platinum and indium clusters soft-landed on surfaces* » R. Alayan, L. Arnaud, M. Broyer, E. Cottancin, J. Lermé, S. Marhaba, J. L. Vialle, and M. Pellarin **Physical Review B** 76 075424 (2007)

- **Google scholar citation:**

Total citations:**959**, h-index:**12**, i10-index:**15**