



Omer Arif

Nationality:

Date of birth:

✉ Email address:

🌐 Website: 🌐 Website:

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WORK EXPERIENCE

Postdoctoral researcher

Istituto Nanoscienze—CNR [30/04/2021 – Current]

City: Pisa

Country: Italy

Currently, I am working as a postdoctoral researcher in the institute of NANO-CNR. My research is focused on the growth and characterization of GaAs/AlGaAs based Quantum cascade laser by using Molecular Beam Epitaxy (MBE).

P.h.D Student

Scuola Normale Superiore [31/10/2016 – 09/06/2021]

City: PISA

Country: Italy

During my Ph.D. study, I have learned the epitaxial growth of III-V Semiconductors materials on Si (111) substrates by Chemical Beam Epitaxy. My activity is focused on the growth of InAs and InSb based heterostructures nanowires.

I have studied detailed morphological, structural, and compositional analyses of the nanowires as a function of growth parameters by scanning and transmission electron microscopy and by energy-dispersive X-ray spectroscopy.

Master in Solid State Physics

Centre of Excellence in Solid State Physics, University of the Punjab [31/08/2013 – 30/09/2015]

City: Lahore

Country: Pakistan

My Master thesis was focused on the synthesis of barium hexaferrites nanoparticles by the sol-gel method and their morphological, structural, magnetic, and dielectric characterization studies.

EDUCATION AND TRAINING

P.h.D in Nanoscience

Scuola Normale Superiore [31/10/2016 – 06/07/2021]

Address: PISA (Italy)

Thesis title: "Self-catalyzed and catalyst-free III-V Semiconductor Nanowires grown by CBE"
Supervisor: Prof. Lucia Sorba

Master in Solid State Physics

University of the Punjab [31/08/2013 – 30/09/2015]

Address: Lahore (Pakistan)

Thesis title: "Effect of sintering temperature on structural, morphological, dielectric and magnetic properties of barium hexaferrites nanocrystallites"

Grade: Very good

Bachelor of Science (B.Sc Honours) in Physics

University of the Punjab [31/08/2009 – 23/07/2013]

Address: Lahore (Pakistan)

JOB-RELATED SKILLS

Job-related skills

1. Vacuum & Growth System

- Epitaxial Growth of GaAs/AlGaAs-based Semiconductor Materials by Molecular Beam Epitaxy (MBE)
- Epitaxial Growth of III-As and III-Sb-based Semiconductors Nanowires by Chemical Beam Epitaxy (CBE)
- Experience working with calibration of growth rates and maintenance of the CBE & MBE systems
- Growth of thin films by RF magnetron sputtering unit
- Deposition of an Au thin film by using a KJL evaporator

2. Characterization techniques

- Scanning electron microscopy: Imaging, Energy dispersive x-ray spectroscopy (EDX), Atomic Force Microscopy (AFM)
- Data analysis of Transmission electron microscopy
- Optical microscopy

3. Optical lithography

- Prepared pattern substrates for the selective area growth

4. Other relevant skills

- Working experience in cleanroom environment ISO 6 and ISO 7
- Oxygen plasma cleaning
- Metal evaporation
- Profilometer
- Wet/Dry Etching
- Served as a trainer for different equipment for other students

Teaching

[13/10/2015 – 31/10/2016]

At Government Murray College in Sialkot, I was a CTI. I had many course while I was an intern for the B.S. (Hons). The following courses caught my attention in particular: mechanics, classical mechanics, quantum physics, and solid state physics.

DIGITAL SKILLS

My Digital Skills

Microsoft Word / Microsoft Excel / Power Point / ImageJ / Origin Pro / Matlab (Basic) / Microsoft Office / Inkscape

COMMUNICATION AND INTERPERSONAL SKILLS

Soft skills

- Ability to work autonomously and in a multi-cultural collaborative environment

- Quick learner
- Problem-solving
- Well-disciplined

LANGUAGE SKILLS

Mother tongue(s): **Urdu**

Other language(s):

English

LISTENING C2 READING C2 WRITING C2

SPOKEN PRODUCTION C2 SPOKEN INTERACTION C2

PUBLICATIONS

Publications

1. GaAs/GaP superlattice nanowires: growth, vibrational and optical properties

Omer Arif, Valentina Zannier, Francesca Rossi, Diego De Matteis, Katharina Kress, Marta De Luca, Ilaria Zardo, Lucia Sorba

Nanoscale

<https://doi.org/10.1039/D2NR02350D>

2. 3D arrangement of epitaxial graphene conformally grown on porousified crystalline SiC

Stefano Veronesi, Georg Pfusterschmied, Filippo Fabbri, Markus Leitgeb, **Omer Arif**, Daniel Arenas Esteban, Sara Bals, Ulrich Schmid, Stefan Heun

Carbon **2022**, 189, 210–218.

<https://doi.org/10.1016/j.carbon.2021.12.042>

3. Self-catalyzed InSb/InAs quantum dot nanowires

Omer Arif, Valentina Zannier, Francesca Rossi, Daniele Ercolani, Fabio Beltram, Lucia Sorba

Nanomaterials **2021**, 11(1), 179.

<https://doi.org/10.3390/nano11010179>

4. Electrical probing of carrier separation in InAs/InP/GaAsSb core-dualshell nanowires

Sedighe Salimian, **Omer Arif**, Valentina Zannier, Daniele Ercolani, Francesca Rossi, Zahra Sadre Momtaz, Fabio Beltram, Sefano Roddaro, Francesco Rossella, Lucia Sorba

Nano Res. **2020**, 13, 1065–1070.

<https://link.springer.com/article/10.1007/s12274-020-2745-5>

5. Growth of Self-Catalyzed InAs/InSb Axial Heterostructured Nanowires: Experiment and Theory

Omer Arif, Valentina Zannier, Vladimir G Dubrovskii, Igor V Shtrom, Francesca Rossi, Fabio Beltram, Lucia Sorba

Nanomaterials **2020**, 10(3), 494.

<https://www.mdpi.com/2079-4991/10/3/494>

6. Growth and strain relaxation mechanisms of InAs/InP/GaAsSb core-dual-shell nanowires

Omer Arif, Valentina Zannier, Ang Li, Francesca Rossi, Daniele Ercolani, Fabio Beltram, Lucia Sorba

Cryst. Growth Des. **2020**, 20(2), 1088–1096.

<https://pubs.acs.org/doi/10.1021/acs.cgd.9b01421>

7. Influence of sintering temperature on structural, morphological, and magnetic properties of barium hexaferrite nanoparticles

M Burhan Shafqat, **Omer Arif**, Shahid Atiq, Murtaza Saleem, Shahid M Ramay, Asif Mahmood, Shahzad Naseem

CONFERENCES AND SEMINARS

Conferences

1. InAs/InP/GaAsSb core-dual-shell nanowires: growth, strain relaxation, and carrier separation

O. Arif, V. Zannier, A. Li, F. Rossi, S. Salimian, D. Ercolani, Z. S. Momtaz, S. Roddaro, F. Rossella, F. Beltram and L. Sorba

Euromat 2021 Virtual Conference (European congress and exhibition on advance materials and processes) 13-17 September 2021

Presented: **Oral talk**

2. Self-catalyzed InSb/InAs Quantum Dot Nanowires

O. Arif, V. Zannier, V. G. Dubrovskii, I. V. Shtrom, F. Rossi, D. Ercolani, F. Beltram, L. Sorba

21st Intl. Conference on Molecular Beam Epitaxy (ICMBE) Virtual Conference 6-9 September 2021

Presented: **Oral talk**

3. Strain Relaxation Mechanisms in InAs/InP/GaSb Core-Multishell Nanowires

O. Arif, V. Zannier, D. Ercolani, A. Li, F. Rossi, S. Salimian, S. Roddaro, F. Rossella, F. Beltram and L. Sorba

FisMat 29 September to 4th October 2019, Catania, Italy.

Presented: **Oral talk**

4. Strain Relaxation Mechanisms in InAs/InP/GaSb Core-Multishell Nanowires

O. Arif, V. Zannier, D. Ercolani, A. Li, F. Rossi, S. Salimian, S. Roddaro, F. Rossella, F. Beltram and L. Sorba

Nanowires Week 23-27 September 2019, Pisa, Italy.

Presented: **Poster**

5. Influence of sintering temperature on structural, morphological and magnetic properties of barium hexaferrite nanoparticles

O. Arif, M. B. Shafqat, S. Atiq, M. Saleem, S. M. Ramay, A. Mahmood, and S. Naseem

International conference of Solid State Physics 13-17 December 2015, University of the Punjab, Lahore, Pakistan.

Presented: **Oral talk**

HONOURS AND AWARDS

Honours and awards

1. I was awarded one full four years scholarship for the Ph.D. program in Nanosciences by the Scuola Normale Superiore, Pisa Italy in 2016.

2. Got 2nd Position in Master (Solid State Physics) among 22 students (2013-2015).