# Saeid Rostami

## PhD, Optical Science and Engineering

**8+** years experimental research in Optics and Photonics
**3+** years theoretical research in Solid State Physics
**2+** years job experience as Optical Engineer

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### SCIENTIFIC EXPERTISE

- Nonlinear optics
- Fiber lasers & amplifiers
- Solid-state lasers
- Semiconductor lasers
- Laser cooling of solids
- Laser stabilization
- Fluorescence spectroscopy
- High vacuum systems
- Cryogenic systems (He, LN)
- Optical metrology
- Electro-optical systems
- Prototype processing
- Optical system design
- Mode-locking
- CPA & MOPA systems
- Plasmonic waveguides
- IR & mid-IR detectors
- Data & Image analysis

### COMPUTER SKILLS

- Zemax
- MATLAB
- LabVIEW
- FORTRAN
- Python
- SolidWorks
- RSoft
- SNLO
- COMSOL

### PUBLICATIONS

- 2 Patents
- 3 Invited SPIE talks
- 6 Journal papers
- 15 Conference papers

### ACADEMIC DEGREES

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| **PhD** | Optical Science and Engineering | University of New Mexico | 2015 – 2020 |
| **MSc (Honors)** | Optical Science and Engineering | University of New Mexico | 2013 – 2015 |
| **MSc (Honors)** | Solid State Physics | Shahid Beheshti University | 2006 – 2009 |
| **BSc (Honors)** | Physics | Arak University | 2002 – 2006 |

**PhD Dissertation Title:** Mid-IR Optical Refrigeration and Radiation Balanced Lasers

**MSc Thesis Title:** Phonons effects on many-body properties of semiconductor nanolayers

### RESEARCH ACHIEVEMENT

- The first demonstration of optical refrigeration in Ho:BYF crystal (potential to achieve sub-80 K temps.).
- Realization of the first all solid-state vibration free optical cryocooler (achieved 135 K at the cold finger).
- The first demonstration of optical refrigeration in Ho:YLF, Tm:YLF, and Yb:Silica materials.
- Developing ultra-wide (1.7-2.8 μm) tunable continuous wave optical parametric oscillator (CW-OPO).
- Developing high-power Tm- and Yb-doped all PM-fiber amplifiers seeded by OPO and Ti-Sapphier lasers.
- Developing Bloch-Jensen hydrodynamical model for surface plasmon-polaritons in plasmonic waveguides.

### PATENTS

- **S. Rostami**, M. Sheik-Bahae, "Optical Refrigerators, Cryocoolers and Athermal Lasers Based on Fluorescenc Upconversion in Holmium-doped Barium Yttrium Fluoride (Ho:BYF) Crystals", STC Ref. No.2021-011-01
- M. Mobini, **S. Rostami**, M. Peysokhan, M. Sheik-Bahae, A. Mafi "Cooling of Yb-doped Silica", STC Ref. No.2020-041-02.

### JOB EXPERIENCE and EXPERTISE

**Postdoctoral Fellow** **Department of Physics and Astronomy** **University of New Mexico**
(current position)

- Lead multidisciplinary projects for developing mid-IR optical cryocoolers, radiation balanced lasers, and novel semiconductor disk lasers.

**Research Assistant** **Department of Physics and Astronomy** **University of New Mexico**
(2014 – 2020)

- Prototype processing to build the first all solid-state vibration-free optical cryocooler.
- Design and construction of high-power tunable (1.7-2.8 μm) continuous wave optical parametric oscillator.
- Design and construction of high-power Tm-doped all-PM fiber amplifier pumped with 793 nm diode lasers.
- Design and construction of DPSS Lasers (Nd & Yb:YAG and YLF, Tm:YLF, rod and disk lasers)
- Ray tracing and thermal link design for Yb-YLF optical cooler with Zemax.
- Designing novel multipass solid-state and semiconductor disk lasers with Zemax (VECSEL & GEMM).
- Cryogenic absorption and emission spectroscopy of Rare Earth- doped materials.
- Working with mode-locked lasers and CPA systems and characterizing ultrashort pulses.
- Hands on experience in optical alignment and laser frequency stabilization (PDH technique).
- Z-scan technique to characterize semiconductors and nonlinear optical materials.
- All optical measurement of external quantum efficiency of semiconductor materials.
- Developing non-contact thermometry based on fluorescence upconversion in Ho-doped crystals.
- Spectroscopy of perovskite quantum dots for non-contact thermometry and imaging.
- Heat load management and heat transfer analysis in COMSOL.
- Hands-on experience with fiber fusion splicer, cleaver, and Vytran angle cleaver.
- Thermal image and data analysis for optical cooling of solids.

**Optical Engineer** **Laser and Plasma Research Institute** **Shahid Beheshti University**
(2010 – 2013)

- Contributing to establishment of an optical communication laboratory based on international standards.
- Performing standard optical tests on active and passive electro-optic devices for DWDM technology.
- Conducting multiple workshops for universities and companies.

**Research Assistant** **Department of Physics and Astronomy** **Shahid Beheshti University**
(2007 – 2009)

- Analysis of electronic and optical properties of 2D semiconductor (GaAs) nanostructures
- Quantum many-particle theory of solids (electron correlations in solids, Feynman diagrams, RPA etc.)
- Numerical analysis of Schrodinger equation for quantum wells, wires and dots.
- Analytical study of surface plasmon-polaritons in plasmonic waveguides.

## AWARDS AND ACHIEVEMENTS

- Doctoral Conference Presentation Award, *University Of New Mexico* (2020)
- 2nd place pitch competition award from SPIE student chapter, *University of New Mexico* (2016)
- 3rd place speaker award in Research Day Competition, *University of New Mexico* (2016)
- Selected as top 100 undergraduate physics students for physics summer school at *IASBS* (2004).

## TRAININGS AND CERTIFICATES

- Extreme Photonics Summer School (May 2013)
- Practical Evaluation of Optical Communication Devices (May 2011)

## SIDE ACTIVITIES

- Vice-president and secretary of the OSA and SPIE student chapters at the University of New Mexico.
- Indoor soccer, biking, hiking, swimming, home construction, cooking, board games, movie etc.