The National Institute of Standards and Technology (NIST), Boulder, Colorado, Communications Technology Laboratory (CTL) has four postdoctoral research positions available. Positions include activities in photomixers, filter design, electrical measurement, and fabrication. (Draft: 4-April-2018)

Photomixer Postdoc Position

Principal Objective:
Develop narrowband optoelectronic devices for the detection of high-speed/mm-wave/terahertz modulated optical signals for single frequency generation. Fabrication of devices using microfabrication techniques including photolithography, e-beam lithography, plasma reactive ion etching, and metal deposition techniques. Integration of optoelectronic devices with optics and on-chip electronics.

General Duties and Responsibilities:
- Fabricate photomixer devices on III-V material systems by microfabrication techniques in NIST cleanroom facility.
- Characterize material and device properties using optical, electrical, and imaging techniques.
- Work as a team to integrate photomixers with frequency comb and on-wafer electronics.
- Provide technical input in formulating research solutions on problems which have been recognized as critical obstacles to progress or development in areas of exceptional interest.
- Studies will result in a series of publications, providing important changes to existing products, processes, techniques, or practices.
- Present technical results.

Knowledge, Skills, and Abilities:
- Experience with microfabrication techniques such as: photolithography, e-beam lithography, plasma reactive ion etching, physical vapor deposition of metals
- Experience with characterization techniques such as: SEM, TEM, XRD, AFM, Hall measurements, pump-probe or photoconductive decay measurements.
- Experience with lasers and optical components
- Ability to code with Matlab, python, or other object-oriented language

THz Electrical Design, Measurement, and Integration Postdoc Position

Principal Objective:
Perform and develop metrology for the measurement of high-speed/mm-wave/terahertz modulated optical signals, on-chip amplifiers to 1 THz, and filter manifolds. The candidate will use state-of-the-art on-chip design methods, measurement and integration techniques in the development of mixed optical/electrical circuits operating from DC to 1 THz. Measurements will include on-wafer scattering parameter measurements, and nonlinear electrical measurements.

General Duties and Responsibilities:
- Measure photomixers, and amplifiers on III-V material systems with on-wafer measurement techniques.
- Develop models on the linear and nonlinear behavior of photomixers and amplifiers.
- Characterize material and device properties using optical, electrical, and imaging techniques.
- Work as a team to integrate photomixers with frequency comb and on-wafer electronics.
• Provide technical input in formulating research solutions on problems which have been recognized as critical obstacles to progress or development in areas of exceptional interest.
• Studies will result in a series of publications, providing important changes to existing products, processes, techniques, or practices.
• Present technical results.

Knowledge, Skills, and Abilities:
• Experience with electrical measurement techniques such as: linear network analysis, four-probe, load-pull, and large signal network analysis.
• Experience with lasers, optical components, frequency generators, spectrum analyzers, and network analyzers
• Ability to code with, or learn to code with: Matlab, Visual Basic, Lab View is required.
• Experience with microwave electronics simulation software (e.g. ADS) is desirable.
• Ability with mechanical and optical design, and fabrication is desirable.

Filter Design Postdoc Position
Principal Objective:
Develop narrowband filters for high-speed/mm-wave/terahertz electrical signals generated from optical signals. Fabrication of resonators and manifolds using microfabrication techniques including photolithography, e-beam lithography, plasma reactive ion etching, and metal deposition techniques. Integration of resonators devices with optics and on-chip electronics.

General Duties and Responsibilities:
• Fabricate resonators devices from novel material systems (UHR silicon, alumina, SrTiO$_3$) by microfabrication techniques in NIST cleanroom facility.
• Characterize material and device properties using optical, electrical, and imaging techniques.
• Work as a team to integrate resonators with photomixers, frequency comb, and on-wafer electronics.
• Provide technical input in formulating research solutions on problems which have been recognized as critical obstacles to progress or development in areas of exceptional interest.
• Studies will result in a series of publications, providing important changes to existing products, processes, techniques, or practices.
• Present technical results.

Knowledge, Skills, and Abilities:
• Experience with microfabrication techniques such as: photolithography, e-beam lithography, plasma reactive ion etching, physical vapor deposition of metals
• Experience with characterization techniques such as: SEM, TEM, XRD, AFM, Hall measurements, pump-probe or photoconductive decay measurements.
• Experience with lasers, optical components, linear network analysis, four-probe, load-pull, and large signal network analysis.
• Ability to code with Matlab, python, or other object-oriented language
Fabrication and Measurement Postdoc Position

Principal Objective:
Fabricate narrowband optoelectronic devices for the detection of high-speed/mm-wave/terahertz modulated optical signals. Fabrication of devices using microfabrication techniques including photolithography, e-beam lithography, plasma reactive ion etching, and metal deposition techniques. Integration of optoelectronic devices with optics and on-chip electronics.

General Duties and Responsibilities:

• Fabricate photomixer devices, resonators, transmission lines on III-V material systems with microfabrication techniques in NIST cleanroom facility.
• Characterize material and device properties using optical, electrical, and imaging techniques.
• Work as a team to integrate amplifiers, resonators, and photomixers with frequency comb and on-wafer electronics.
• Provide technical input in formulating research solutions on problems which have been recognized as critical obstacles to progress or development in areas of exceptional interest.
• Studies will result in a series of publications, providing important changes to existing products, processes, techniques, or practices.
• Present technical results.

Knowledge, Skills, and Abilities:

• Experience with microfabrication techniques such as: photolithography, e-beam lithography, plasma reactive ion etching, physical vapor deposition of metals
• Experience with characterization techniques such as: SEM, TEM, XRD, AFM, Hall measurements, pump-probe or photoconductive decay measurements.
• Experience with lasers, optical components, network analyzers, and electrical measurement tools
• Ability to code with Matlab, python, or other object-oriented language

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