Rajavardhan Talashila

RF & Microwave Engineer | Quantum Sensing Researcher

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PROFESSIONAL SUMMARY

RF/microwave engineer and Quantum Sensing Researcher with dual Ph.D.s (CU Boulder, IIT Madras) and 5+ years of industry and national-lab experience. Proven track record bridging full-wave electromagnetic simulation (HFSS, SystemVue), phased-array beamforming, and Rydberg-atom RF receiver hardware from concept to patent disclosure.

PROFESSIONAL EXPERIENCE

Project Associate — NIST (CU Boulder PREP), Boulder, CO | *Jan 2024 – Present*

- Investigated RF-induced avoided crossings in Rydberg-EIT spectra and identified the underlying RF-dressed-state coupling mechanisms using Floquet/Shirley calculations.
- Developed standing-wave-based AoA estimation using subwavelength, amplitude-only measurements, experimentally demonstrated at 4.3 GHz, 5 GHz, and 5.7 GHz with 1.7° resolution from 0° to 60°.
- Developed spectral AoA estimation using AC Stark-shifted Rydberg-EIT spectra, experimentally demonstrated at RF frequencies of 1.27 GHz, 2 GHz, 3 GHz, and 4 GHz with 2° resolution in 20° to 40° range.
- Characterized Rydberg-atom sensor response in the VHF/UHF bands (50 MHz to 900 MHz) through RF measurements, field calibration, and evaluating relative sensitivity trends across Rydberg states.
- Investigated Rydberg-atom RF detection mechanisms, intrinsic detection nonlinearities, and communication bandwidth limitations across a broad parameter space of signal and local oscillator (LO) amplitudes.

Senior Application Engineer — Ansys, Bengaluru, India | *Sep 2021 – Aug 2023*

- Architected an end-to-end, bit-level multi-physics simulation framework (Keysight SystemVue, Ansys HFSS, STK) for Air Force Research Laboratory (AFRL) digital beamforming phased-array transceivers, modeling realistic RF nonlinearities, inter-link interference, and dynamic link budgets.
- Integrated digital and analog transceiver models in SystemVue, modeled beamforming antenna arrays in HFSS, and scenario-level simulations in STK to evaluate multi-link communication system performance.
- Analyzed bit error rate (BER), signal-to-noise ratio (SNR), error vector magnitude (EVM), array gain, beam steering, inter-link interference, and link budgets, accounting for RF nonlinearities, component characteristics, and antenna effects.
- Solved high-frequency antenna, EMI/EMC, and SI/PI bottlenecks for clients using Ansys HFSS and SIwave, accelerating customer design validation cycles and driving technical presales adoption.

ADDITIONAL PROFESSIONAL EXPERIENCE

Project Assistant — 5G Testbed, IIT Madras, Chennai, India | *Nov 2020 – Oct 2021*

- Designed, fabricated, and experimentally characterized a microstrip filter for a 5G NR n78 base station.

Junior Telecom Officer — BSNL, Maharashtra, India | *Aug 2010 – Jul 2012*

EDUCATION

University of Colorado Boulder

Ph.D. (EE: Quantum Sensing) (GPA: 3.83/4) — Expected: December 2026

M.S. (EE) — 2025

Indian Institute of Technology Madras

Ph.D. (EE: RF & Microwave) (GPA : 8.34/10) — 2021

M.Tech. (Photonics) (GPA : 8.34/10) — 2021

JNTU Hyderabad

B.Tech. (ECE) — 2009

TECHNICAL EXPERTISE

RF / Microwave: Antennas, phased arrays, beamforming, RF sensing and measurements, EMI/EMC, SI/PI

Quantum Sensing: Rydberg-EIT, RF electrometry, AC Stark shifts, Floquet/Shirley analysis, optical spectroscopy

Modeling & Software: Ansys HFSS, SIwave, CST Microwave Studio, Keysight SystemVue, MATLAB

Programming: Python, Fortran, CUDA Fortran, LabVIEW

Experimental Methods & Instrumentation: RF calibration, experimental automation, vector network analyzers, spectrum analyzers, lock-in amplifiers, and laser systems.

SELECTED PUBLICATIONS & PREPRINTS

Rydberg Quantum Sensing

- Talashila, R. et al. , J. Appl. Phys. 138, 114402 (2025).
- Talashila, R. et al. (2026), arXiv:2609.06062
- Talashila, R. et al. (2026), arXiv:2609.17459
- Talashila, R. et al. (2026), arXiv:2610.40952

RF & Electromagnetic Theory

- Talashila, R. and Ramachandran, H. (2020), *IEEE AWPL*, 19(12), pp. 2136–2140.
- Talashila, R. and Ramachandran, H. (2019), *IEEE AWPL*, 18(4), pp. 646–650.
- Talashila, R. and Ramachandran, H. (2021), *Engineering Reports*, 3(9), p. e12402.

INVENTION DISCLOSURES / PATENT CONTRIBUTIONS

- Rydberg Electrode Cell Angle of Arrival Estimator
- 2D electromagnetic field imager using light-sheet fluorescence spectroscopy of Rydberg states