

The 19th U.S.–Korea Forum on Nanotechnology

Remote Sensing with Rydberg Atoms. Darindra Arumugam, Ph.D.

NASA Jet Propulsion Laboratory, USA



Dr. Darindra Arumugam is a senior research technologist at NASA's Jet Propulsion Laboratory (JPL), California Institute of Technology, where he leads efforts in atomic sensors for remote sensing, applied physics, and novel sensor systems. He serves as the technical group supervisor for the Radar Concepts and Formulation Group at JPL, overseeing development of advanced sensing architectures across radar and electromagnetic domains. Dr. Arumugam received his Ph.D. from Carnegie Mellon University.

His research focuses on quantum and atomic sensor technologies, particularly using Rydberg atoms for electric field sensing across a broad frequency spectrum—from DC to THz. He has led the development of compact, tunable Rydberg-based sensors for airborne platforms and bistatic radar systems using signals of opportunity. Dr. Arumugam is also pioneering the use of dissipative time crystal (DTC) dynamics in Rydberg vapors to realize ultra-sensitive detection of low-frequency electromagnetic fields, targeting the ELF, VLF, and SLF regimes for future applications in subsurface, and geophysical sensing. His work is opening new directions in reconfigurable quantum sensors with applications spanning Earth and Planetary science.