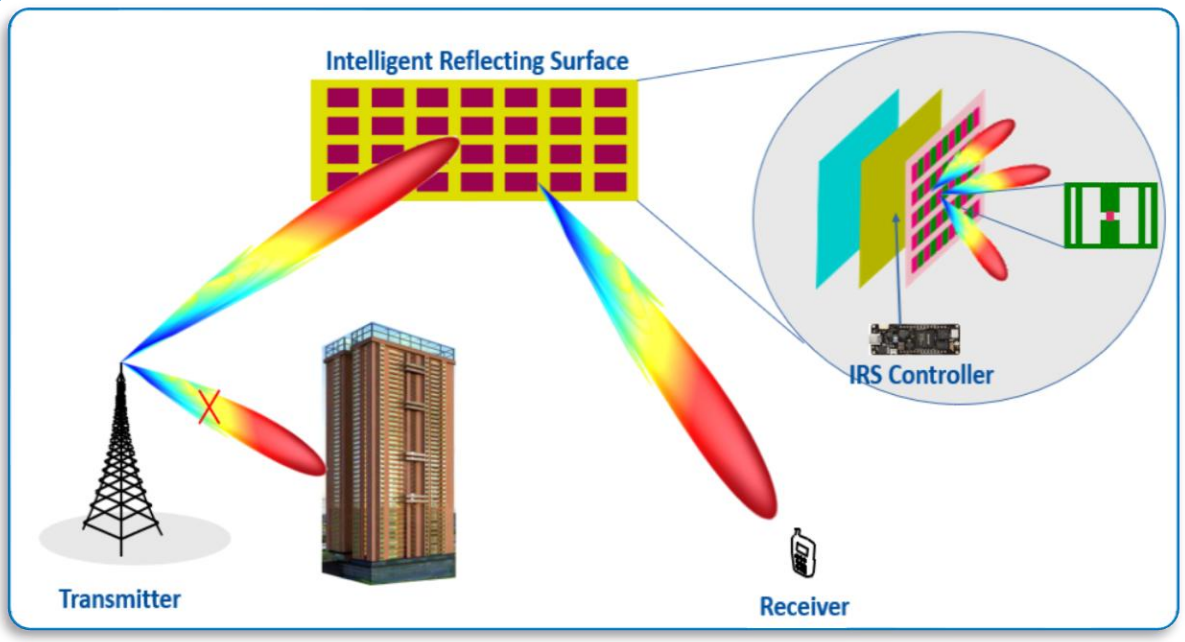
6G Sub-Terahertz Testbed

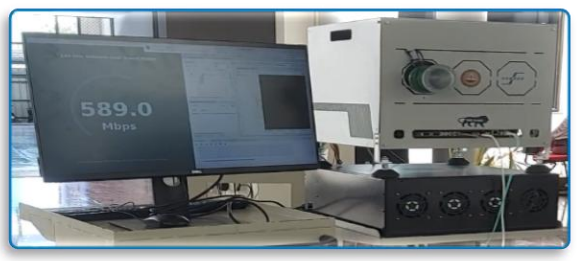
"Enabling High-Throughput Non-Line of Sight Communication"



6G sub-THz Testbed with Intelligent Reflecting Surface Enabled Non-Line of Sight Wireless Communication



D-band transmitter with baseband for 6G sub-THz Testbed



D-band receiver with baseband for 6G sub-THz Testbed

The sub-THz 6G testbed incorporating an Intelligent Reflecting Surface (IRS) demonstrates Non-Line-of-Sight (NLoS) communication by intelligently controlling the reflected signals towards the receiver, thereby establishing a reliable communication link in obstructed environments.

Key Features

- D-band (140 GHz) Line-of-sight (LoS) communication link with high data throughput
- Static and dynamic intelligent reflecting surface (IRS) for non-line-of-sight (NLoS) communication

Applications

- Ultra-high bandwidth, low-latency data transport in 6G networks
- Telecom infrastructure
- Smart data centre interconnects

SOCIETY FOR APPLIED MICROWAVE ELECTRONICS ENGINEERING AND RESEARCH

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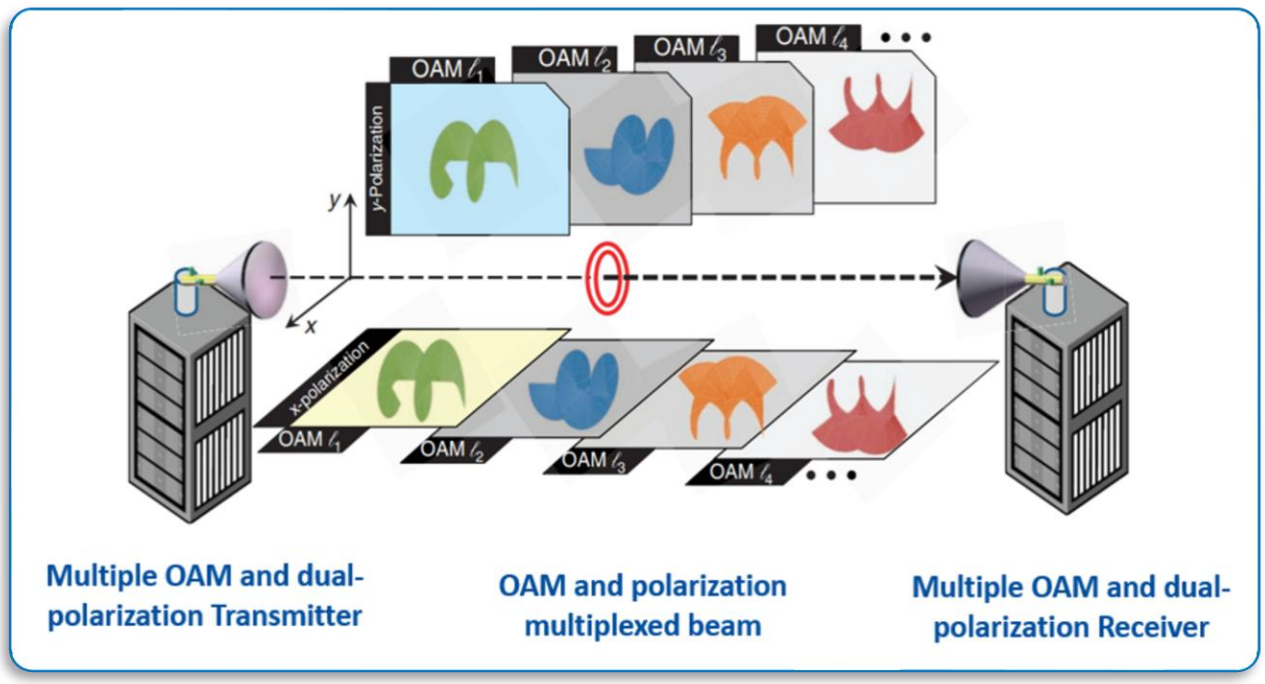
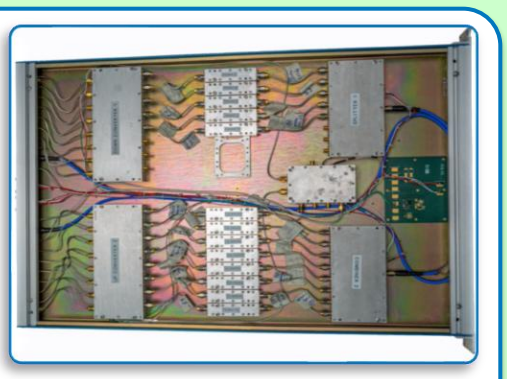
6G Terahertz Testbed

" Enabling Ultra High-Throughput Communication with Multiplexing"



6G THz Testbed with Orbital Angular Momentum and Multiplexing



Up/Down converter for 6G THz Testbed



J-band transmitter for 6G THz Testbed

The 6G terahertz testbed incorporating Orbital Angular Momentum (OAM) combines ultra-high-frequency J-band wireless hardware with twisted electromagnetic wavefronts to increase data capacity for 6G and beyond

Key Features

- J-band (268-283 GHz) communication link with ultra-high data throughput
- OAM based beams with helical phase front, allowing orthogonal OAM modes to propagate co-axially and carry independent data streams on the same frequency

Applications

- 6G Wireless Backhaul and Fronthaul
- Data Center Wireless Interconnects
- Ultra-High-Rate Short-Range Links

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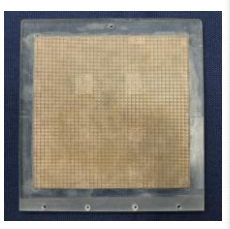
Components for THz/Sub-TH Testbeds

" Indigenous Solutions for a Connected Future"

						
J-band Sub-harmonic Mixer	D-band Frequency Doubler	J-band Band Pass Filter	Ku-band Phase Locked Loop	D-band Waveguide Bend	C-band IRS	D-band Elliptic Lens Antenna
						
D-band Sub-harmonic Mixer	V-band Frequency Quadrupler	D-band Band Pass Filter	C-band Band Pass Filter	J-band Waveguide Bend	D-band Static IRS	J-band OAM Antenna

Indigenisation across the D-band (135-145 GHz) and the J-band (268–283 GHz) transceiver hardware and antenna systems

Key Features

- Sub-harmonic mixers with low conversion loss at D and J bands
- Frequency multipliers with low conversion loss and high output power at D and V bands
- Band pass filters with ultra-low insertion loss and sharp roll-off at D and J bands
- Dynamic and static IRS at C and D-band, respectively
- Elliptic lens antenna with high gain and narrow beam at D-band
- Mode-reconfigurable OAM antenna at J-band

Applications

- Sub-harmonic mixers up/down convert RF signals in the transmitters/receivers
- Multipliers provide stable reference signal to the mixers for up/down conversion
- Band pass filters help in selecting the desired channels and suppressing interference
- IRS enables non-line-of-sight communication

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