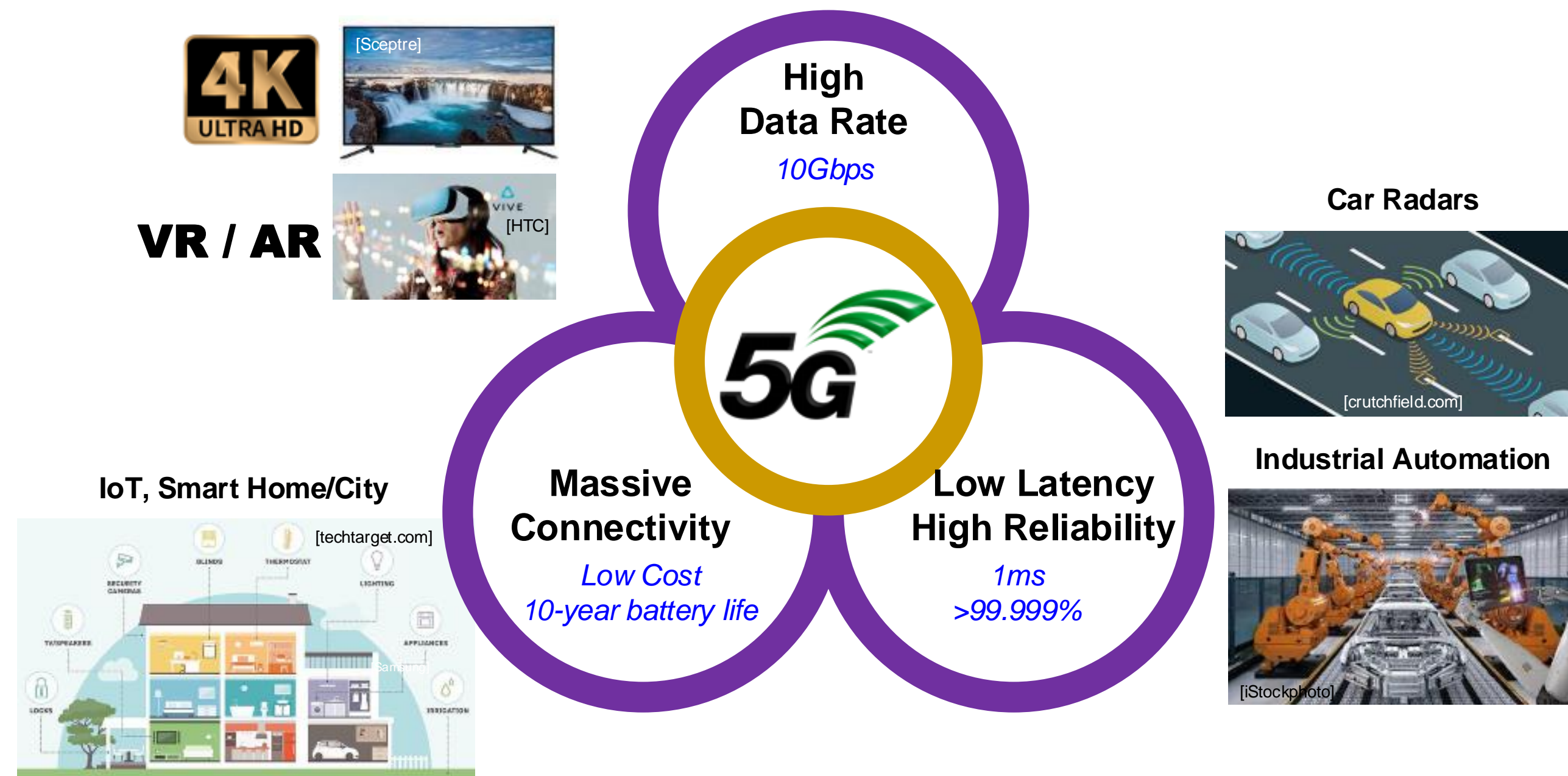




AREA AND POWER OPTIMIZED TECHNIQUES FOR MM-WAVE PHASED-ARRAY FRONT-ENDS

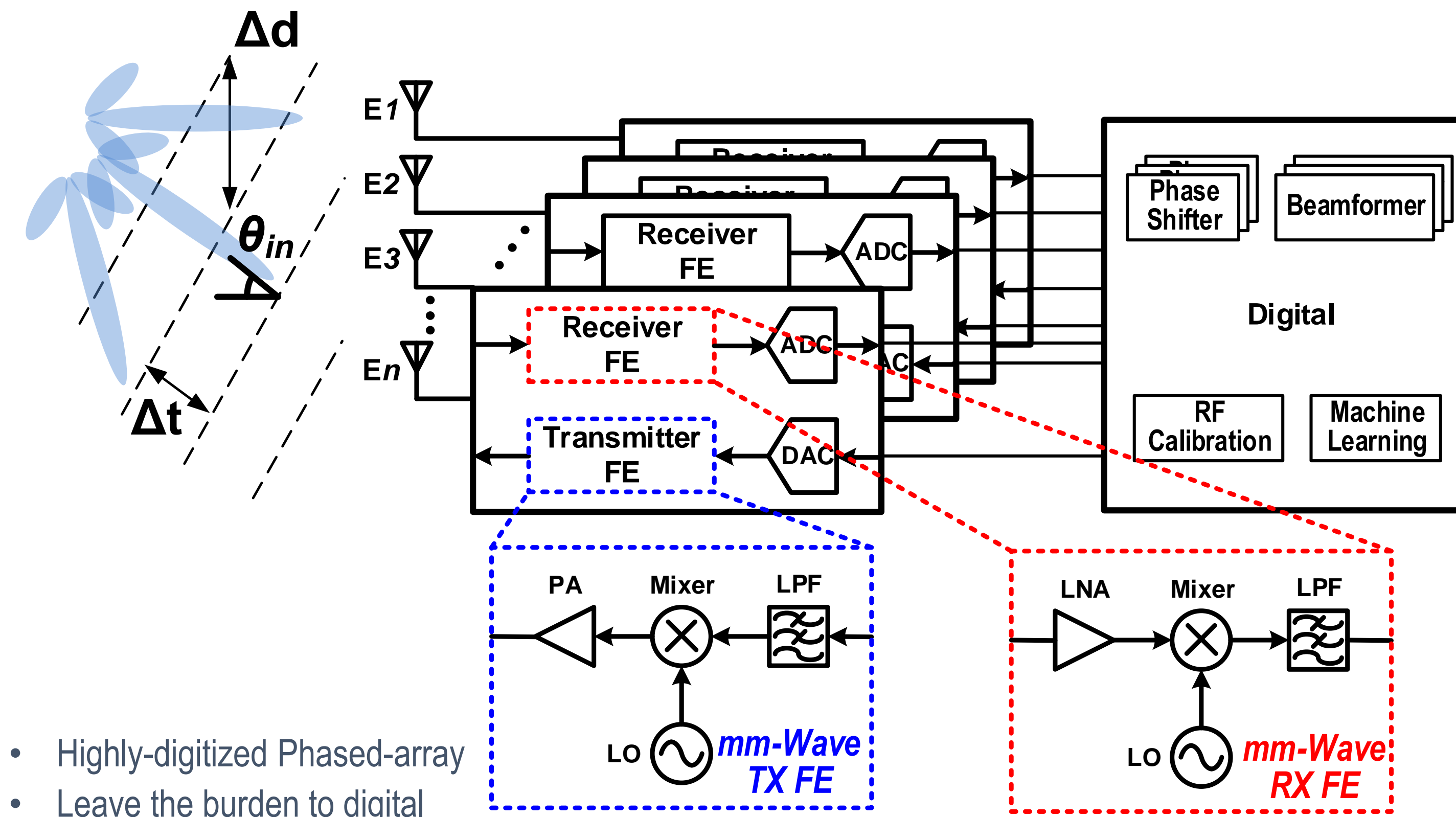
STUDENTS: KUN-DA CHU, DIEGO PENA, IVAN ZHAO, DENIZ DOSLUOGLU

5th-Gen Communications



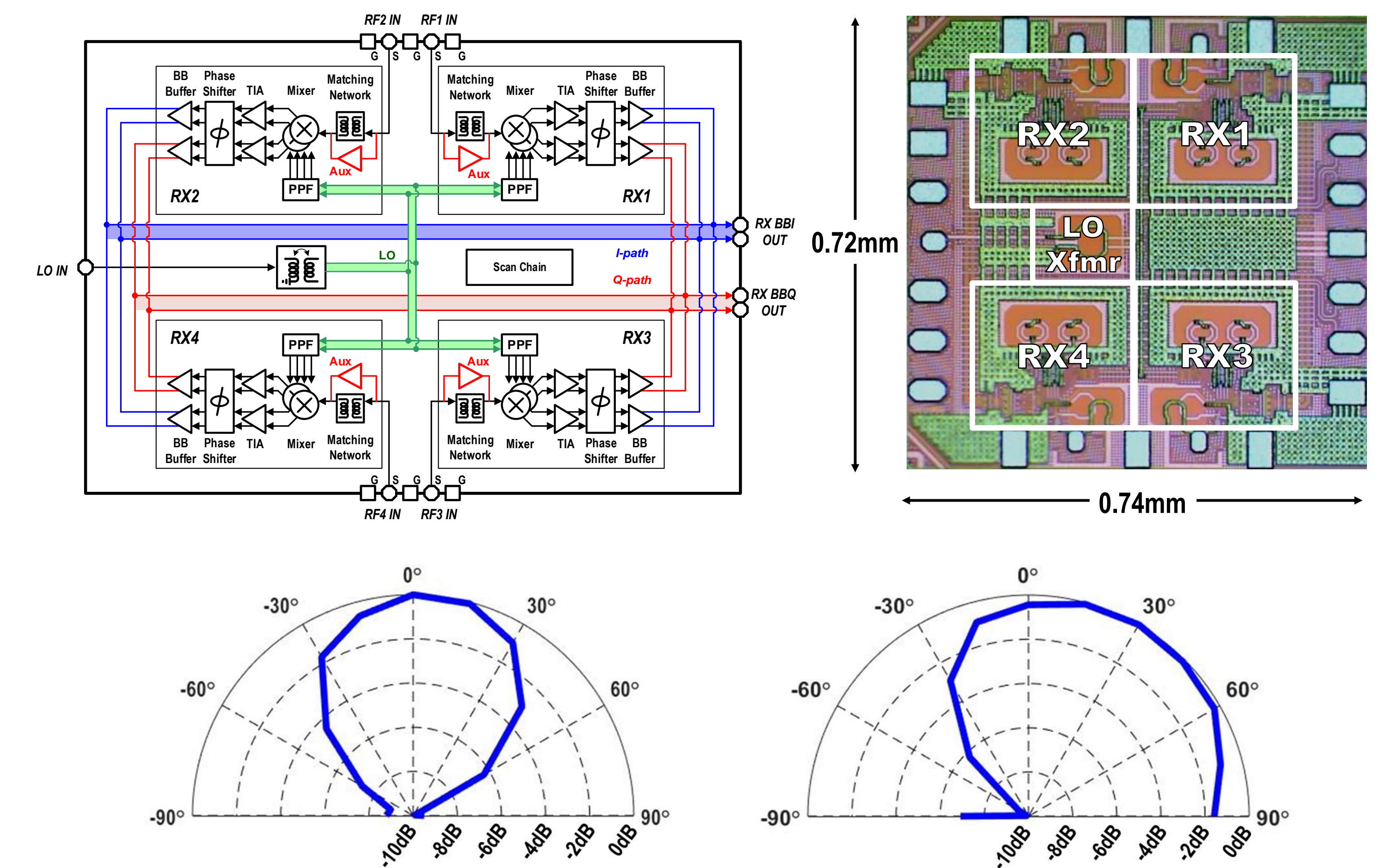
- Next generation radios: high data rate, massive connectivity, low latency
- Enable a lot more possible applications.
- Eg: extremely high-quality videos, internet of things (IoT), car radars, and more...

Techniques for digital mm-Wave Phased-Array

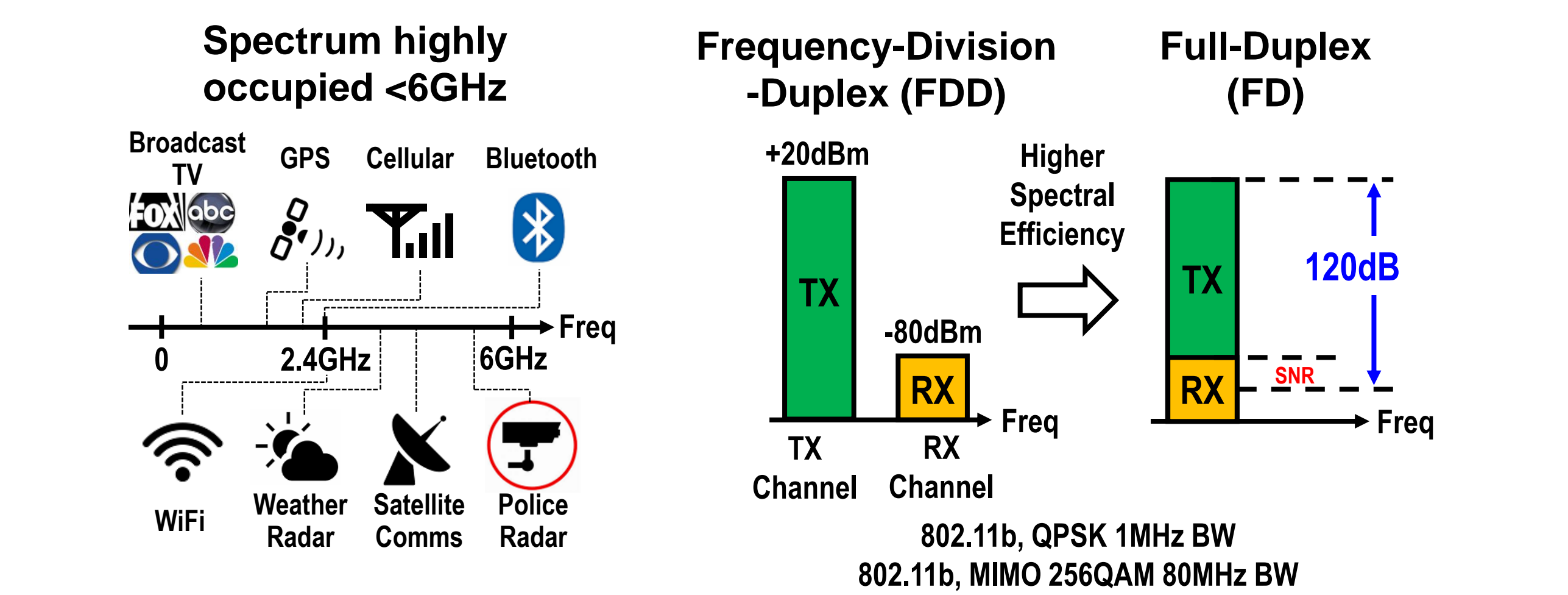


- Highly-digitized Phased-array
- Leave the burden to digital
- Generate multiple directional beams digitally
- Simplified analog front-ends with digital calibration / compensation
- Even possible to apply *Machine Learning* techniques (collaboration with Prof. Sathe)

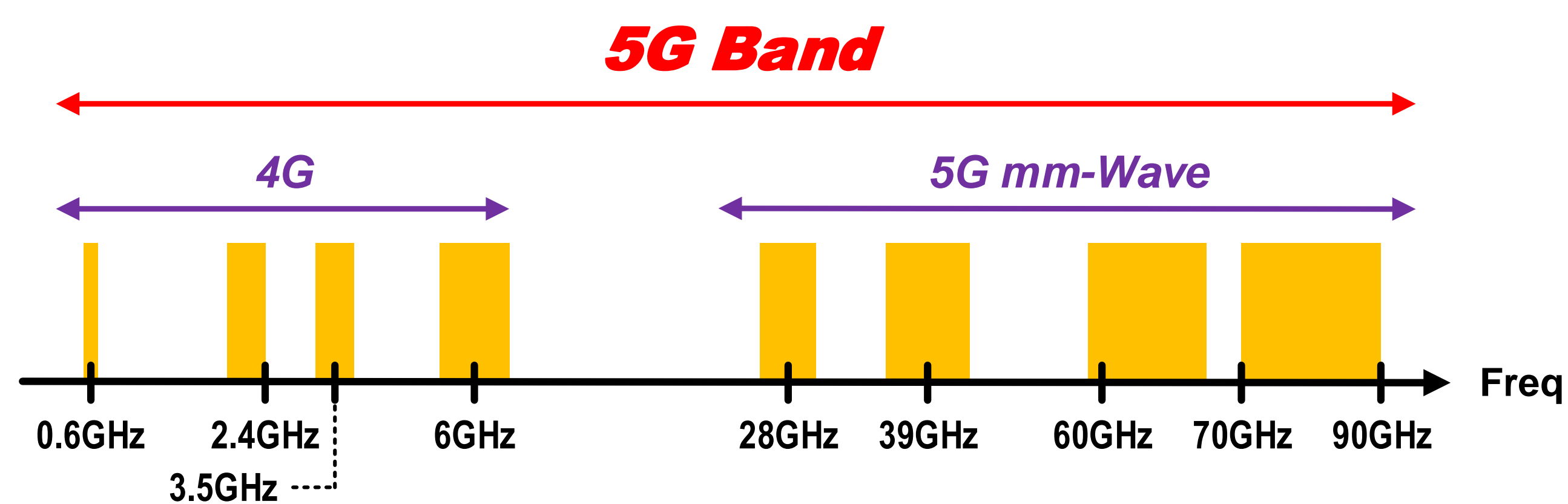
V-band 2x2 Pseudo Mixer-first Phased-array Receiver



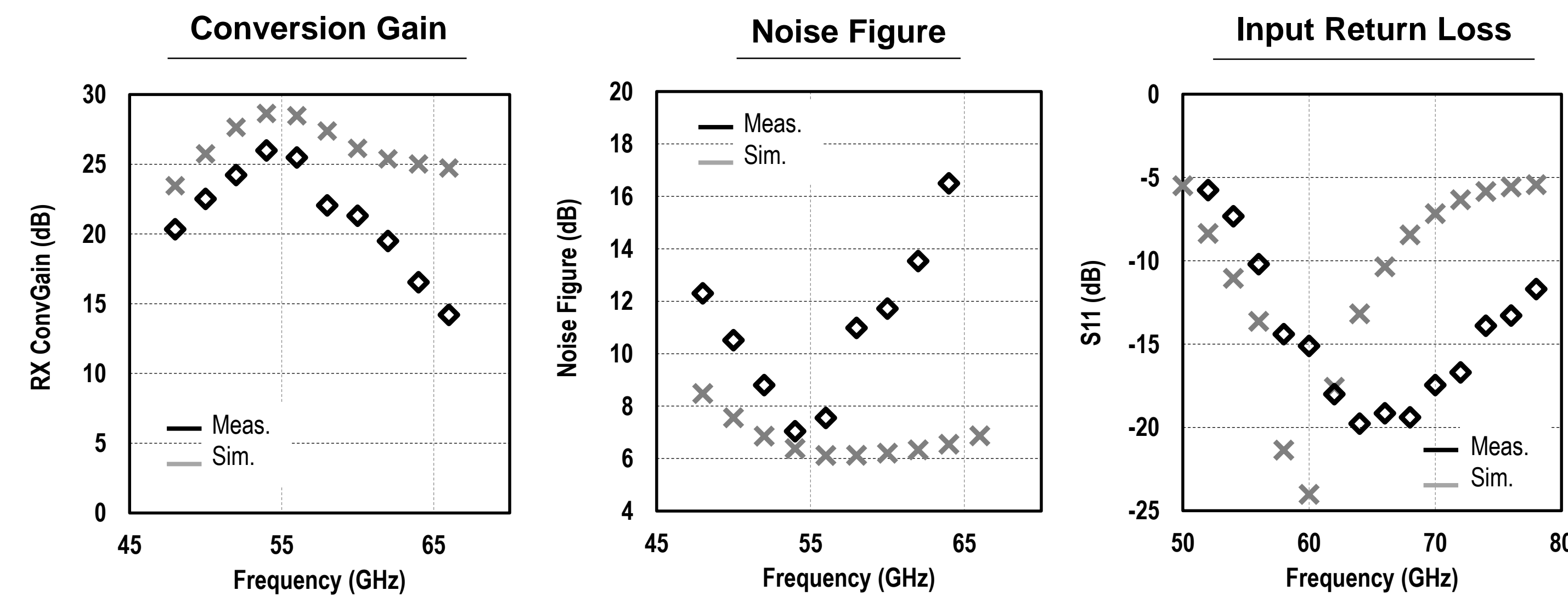
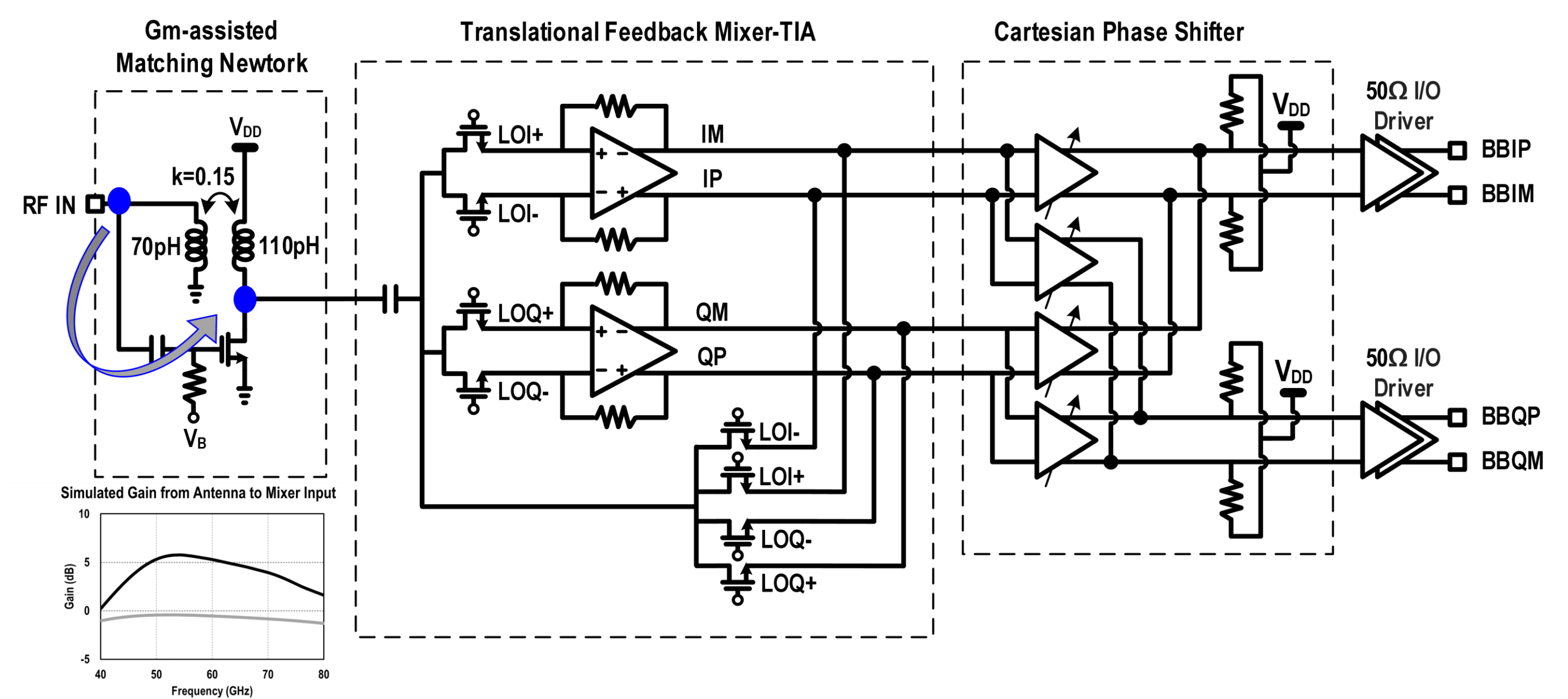
New Spectrum Opportunities



- Very crowded sub-6GHz spectrum
- Improving Spectral Efficiency
 - High-level modulations, eg: 1024-QAM, 2k-QAM, 4k-QAM
 - Full-duplex techniques
- New spectral territory: much wider bandwidth at mm-Wave bands



V-band Gm-assisted Transformer-based Mixer-first Receiver



Measurement Setup

