

Mixer-First 4-Element mm-Wave Digital Beamforming **Receiver with High-Speed Low-Resolution ADCs**

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• *Machine Learning* for adaptive beamforming



- the I and Q paths
- Complete digital back-end with tunable filters, beamforming weights and memory

ELECTRICAL & COMPUTER ENGINEERING

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Prototype Chip

- Taped-out AFE & DBE SoC in TSMC 28nm HPC+ • Includes stand-alone test structures for ADC, Mixer-First FE
- RF input applied on west with 13-contact probe • Scan chain tuning and memory read with
- Raspberry Pi





CLK





Future steps include:

- Demodulating QPSK signal on-chip, measuring BER

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• Further experiments with dithering, tuning to improve ADC SNDR

