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ASIC² PROJECT: LOADED-LINE PHASE-SHIFTER BASED ON PCM RF SWITCHES

In multi-band and reconfigurable RF architectures, the RF switch is a fundamental component for controlling the flow of the RF signal and providing tunable capabilities to filters, amplifiers, and other components. Recently, memristive technologies such as ReRAM, CBRAM, and PCM have emerged as promising candidates for high-performance RF switches due to their superb transmission properties, small footprint, low switching time and energy, scalability, CMOS compatibility, and non-volatility.

Project Description:

In this project, a loaded-line phase shifter based on the PCM RF switch that we are developing at our group will be designed and evaluated. Phase shifters are fundamental devices to control the steer the beam in an antenna array and a great number of phase-shifters are required for this critical functionality in 5G and radar systems. PCM RF switches can increase the performance, while reducing the area overhead and the power consumption of these devices. .

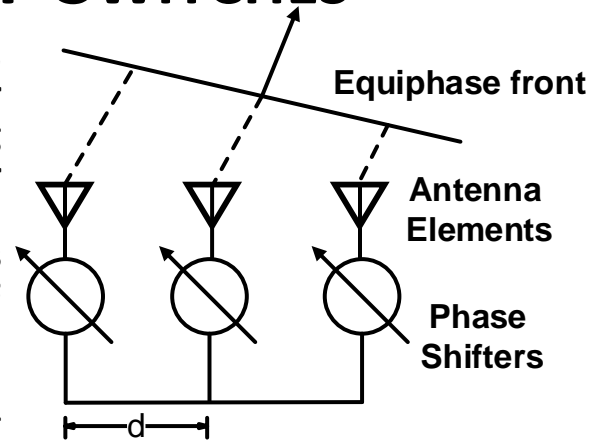


Figure 1 - Phased antenna array

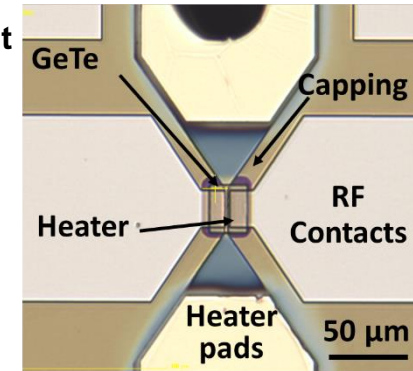


Figure 2 – Optical view of the PCM RF switch

Schedule:

- Study the working principles of the PCM RF switch.
- Design of the loaded-line phase shifters for the K-band (18-26.5 GHz).
- Simulations in Cadence Virtuoso or ADS and performance evaluation.

Course Requirements:

Waves & Distributed systems, Circuit Theory, RFIC course (recommended)

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