DATERAC

Development and applications of exploratory technologies for the reconfiguration of antennas and microwave devices

Context

- xG, IoT, Radars, satellites, etc.: needs for reconfigurable RF front-ends
- How? PIN or varactor diodes, FET, MEMS, various materials, etc.
- But: several limitations (loss, switching time, integration complexity, parasitic elements, etc.)

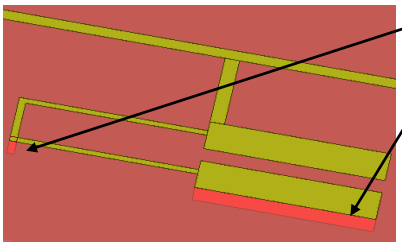
DATERAC : 2 innovative solutions

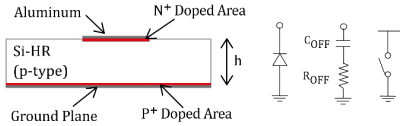
- Doped areas on silicon substrate
- Optical control using chalcogenide glasses

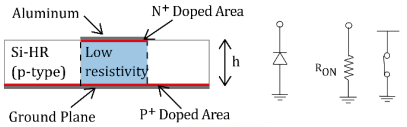
And association of the 2 technologies

Reconfigurable resonator based on doped areas

- Co-design passive device / semi-conductor junction
- More design flexibility
- No component postponement
- One DC signal to control several junctions

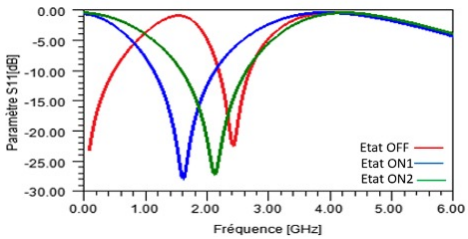


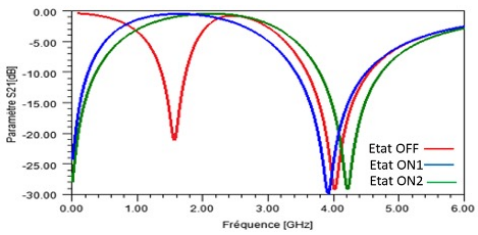




On going:

- First measurements
- Frequency switchable antennas
- Etc.





Example of a 3-state reconfigurable resonator and associated responses

Optical control based on chalcogenide glasses

- Phase Change Materials with 2 stable states: Amorphous (high resistivity) / Crystalline (low resistivity)
- *First tests:*
  - First material (GST) characterizations
    Resistivity ratio ≈ 1.2×10^5 => state-of-the-art!
  - Laser characterizations: fluence, spot shape, wavelength, etc.
- *On going:*
  - Fabrication of first microwave reconfigurable circuits
  - Study of different materials composition