

## **Reconfigurable Slot-Ring Antennas for Array Applications**

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Reconfigurable antenna arrays can enable low-cost development of wideband or multi-band RF systems by employing reconfigurability in terms of resonant frequency, bandwidth, polarization and radiation pattern. In addition, for an antenna array, element spacing considerations over a wide frequency range are also necessary in order to avoid grating lobes. These requirements make reconfigurable antenna arrays very challenging to design. Most of earlier works on reconfigurable antennas are primarily focused on a single radiating element. Therefore, novel approaches need to be sought after.

In this presentation, we will present reconfigurable slot-ring antennas for array applications. (C. R. White and G. Rebeiz, IEEE Trans. AP, vol. 57, no. 1, pp. 19-26, 2009) presented single- and dual-polarized tunable slot-ring antennas. By placing the tuning elements, i.e. varactors, inside the slots where the electric field is the strongest, the slot-ring antenna can achieve octave frequency tuning range. However, the instantaneous bandwidth is limited to a few percent. This antenna can also achieve two polarization states due to the symmetry in its physical structure. This concept is extended to design an antenna array which can cover 1:6 frequency tuning range. There are two approaches we used to achieve this goal: (1) a switchable tri-band antenna array with analog frequency tuning within each band; (2) a switchable tri-band antenna array with each band covering the entire band. With a common aperture, this reconfigurable antenna array can support seamless operations from 2-12 GHz. Design challenges and solutions in order to achieve the tuning range, bandwidth, desirable radiation pattern and switchable polarization states will be presented in the conference.