

Metamaterials for radio astronomy engineering

Metamaterials are artificially engineered materials with electrical and magnetic properties not occurring in nature at radio frequencies – examples include “double negative” materials, with negative permittivity and permeability. These have been used in the theoretical development of transformation optics for electromagnetic cloaking, which has been demonstrated experimentally for some special geometries.

The aim of this project is to investigate the use of metamaterials for realizing new concepts in antenna elements for low-frequency radio telescopes, such as SKA-Low and other concepts. One line of investigation will focus on dense, regular arrays where strong mutual coupling complicates the design of wideband antenna arrays.

The application of metamaterials is an important topic in contemporary antenna engineering in general and this project overlaps strongly with many other applications of antennas in telecommunications, defence etc.

Research Field

Engineering

Project Suitability

MSc or PhD

Project Supervisor

Prof David Davidson

david.davidson@curtin.edu.au

Co-Supervisors

Dr Maria Kovaleva

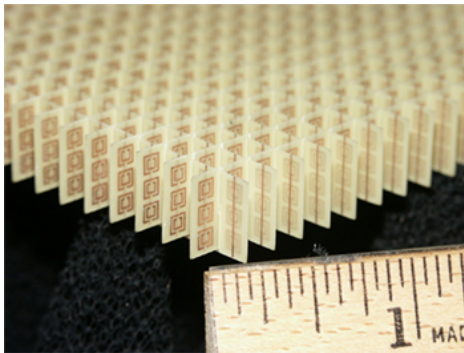


Figure 1: A split-ring resonator, part of a metamaterial array. Credits: NASA, public domain.