



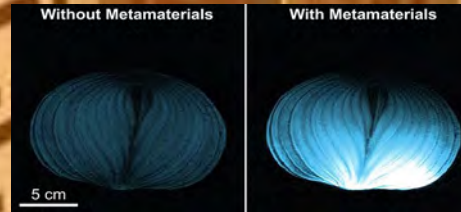
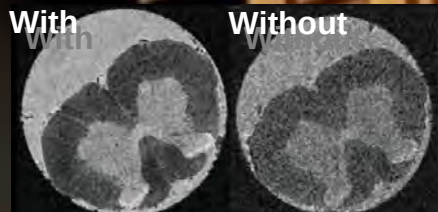
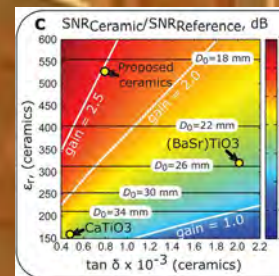
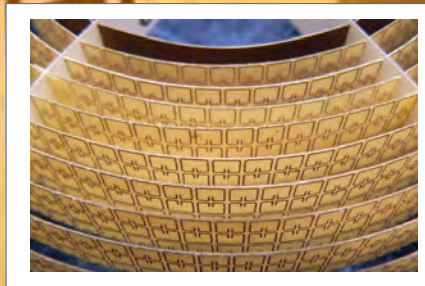
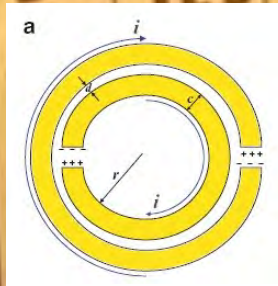
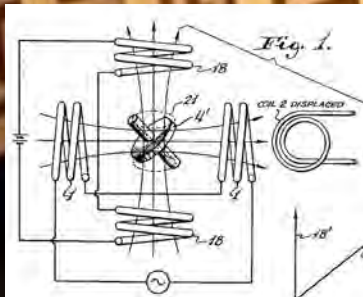
## GIDRM Workshop

# Metamaterials and Metasurfaces in Magnetic Resonance: From Theory to Applications

30 November 2020

University of Pisa, Department of Information Engineering, Italy

[www.gidrm.org](http://www.gidrm.org)



Registration is free, but reserved to GIDRM associates with regular payment for 2020 and to new GIDRM associates. New associations to GIDRM will remain valid throughout 2021 and will include free access to all 2021 GIDRM days and school organised in a telematic way. Registration is open at [www.gidrm.org](http://www.gidrm.org) and deadline is 24th November 2020



### LOCAL ORGANIZING COMMITTEE

- Agostino Monorchio (University of Pisa)
- Danilo Brizi (University of Pisa)
- Nancy Fontana (University of Pisa)

### AIMS

A metamaterial (MM) is a material engineered to have a property that is not found in naturally occurring materials. MM are made from assemblies of multiple elements fashioned from composite materials such as metals and dielectric. The constitutive materials are usually arranged in repeating patterns, at scales that are smaller than the wavelengths of the phenomena they influence.

The primary goal of this GIDRM workshop on MM in Magnetic Resonance is to bring together the communities of chemists, physicists, engineers, computer scientist, biologists, physicians to explore this rapidly expanding field. The workshop will provide a theoretical introduction to MM. A review of experimental methods suitable to assemble and test a MM based on bulk or surface structures. It will also be considered how to analyse the dependence of MM properties on the operating frequency (magnetic field). The numerical electromagnetic tools suitable for MM modelling will be reviewed. Given the expanding field of MM use in Magnetic Resonance, we will present and discuss several practical examples related to improved NMR and MRI features.

### SCIENTIFIC COMMITTEE

- Marco Geppi (University of Pisa)
- Marcello Alecci (University of L'Aquila)
- Mariapina D'Onofrio (University of Verona)
- Silvia Borsacchi (CNR Pisa)
- Simonetta Geninatti Crich (University of Turin)
- Giacomo Parigi (University of Florence)
- Giuseppe Pileio (University of Southampton)
- Agostino Monorchio (University of Pisa)
- Angelo Galante (University of L'Aquila)
- Andrew Webb (University of Leiden)
- Stefan Enoch (Aix Marseille University)

Monday, 30<sup>th</sup> November 2020

09:30-09:45

On-line  
connection via  
Teams

## Virtual GIDRM Workshop

“Metamaterials and Metasurfaces in Magnetic Resonance:  
From Theory to Applications”

09:45-10:15

Welcome and Opening

Marco Geppi (President GIDRM), Representatives from the  
University of Pisa/Department of Information Engineering,  
Agostino Monorchio (Chair Local Committee)

Chairs: Georgiy Solomakha, Angelo Galante

10:15-11:00

Andrew Webb: “Metamaterials and Metasurfaces for NMR/MRI:  
Overview and Applications”

11:00-11:30

Andreas Rennings: “Metamaterial Based Enhancements of RF Coils for  
UHF MRI”

11:30-12:00

Break + Open Networking Room

Chairs: Gianluigi Tiberi, Nunzia Fontana

12:00-12:30

Carlo Rizza: “Spoof Magnetic Localized Surface Plasmons to Enhance  
Magnetic Resonance Applications”

12:30-13:00	<b>Filiberto Bilotti:</b> “Metamaterials and Metasurfaces: Overview and Applications”
13:00-14:30	<b>Lunch Break</b>
	<b>Chairs: Andreas Rennings, Carlo Rizza</b>
14:30-15:00	<b>Manuel J. Freire:</b> “Capacitively-Loaded Ring Metamaterials for MRI: A Review of Applications”
15:00-15:30	<b>Georgiy Solomakha:</b> “Advanced Electromagnetics for Clinical and UHF MRI”
15:30-15:45	<b>Break + Open Networking Room</b>
	<b>Chairs: Andrew Webb, Agostino Monorchio</b>
15:45-16:15	<b>Danilo Brizi:</b> “Decoupling Metasurfaces for 7T MRI Double-Tuned RF Coils”
16:15-17:00	<b>ROUND TABLE:</b> “Are We Ready for an EU Network on Metamaterials/Metasurfaces for NMR/MRI Applications?”
17:00-17:15	<b>Marco Geppi:</b> Closure and Adjournment