

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 th November 2020
09:00-09:45	Virtual GIDRM Workshop
On-line via Teams	"Metamaterials and Metasurfaces in Magnetic Resonance: From Theory to Applications"
09:45-10:15	Welcome and Opening
	Marco Geppi (President GIDRM, University of Pisa, Italy), Representatives from the University of Pisa/Department of
	Information Engineering, Agostino Monorchio (Chair Local Committee, University of Pisa, Italy)
	Chairs: Georgiy Solomakha (ITMO University, Russia), Angelo Galante (University of L'Aquila, Italy)
10:15-11:00	Andrew Webb (Leiden University Medical Center, the Netherlands):
	"Metamaterials and Metasurfaces for NMR/MRI: Overview and Applications"
11:00-11:30	Andreas Rennings (University of Duisburg-Essen, Germany):
	"Metamaterial Based Enhancements of RF Coils for UHF MRI"
11:30-12:00	Break + Open Networking Room
	Chairs: Gianluigi Tiberi (UBT, Italy), Nunzia Fontana (University of Pisa, Italy)
12:00-12:30	Carlo Rizza (CNR-SPIN Institute L'Aquila, Italy):
	"Spoof Magnetic Localized Surface Plasmons to Enhance Magnetic Resonance Applications"
12:30-13:00	Filiberto Bilotti (University "Roma Tre", Italy):
	"Metamaterials and Metasurfaces: Overview and Applications"
13:00-14:30	Lunch Break
	Chairs: Andreas Rennings (University of Duisburg-Essen, Germany), Carlo Rizza (CNR/SPIN Institute L'Aquila, Italy)
14:30-15:00	Manuel J. Freire (University of Seville, Spain):
	"Capacitively-Loaded Ring Metamaterials for MRI: A Review of Applications"
15:00-15:30	Georgiy Solomakha (ITMO University, Russia):
	"Advanced Electromagnetics for Clinical and UHF MRI"
15:30-15:45	Break + Open Networking Room
	Chairs: Andrew Webb (Leiden University Medical Center, the Netherlands), Agostino Monorchio (University of Pisa, Italy)
15:45-16:15	Danilo Brizi (University of Pisa, Italy):
	"Decoupling Metasurfaces for 7T MRI Double-Tuned RF Coils"
16:15-16:45	Marc Dubois (Aix Marseille University and Multiwave Imaging SAS, France):
	"Hybridized Meta-Atom for UHF MRI"
16:45-17:30	ROUND TABLE:
	"Are We Ready for an EU Network on Metamaterials/Metasurfaces for NMR/MRI Applications?"
17:30-17:45	Marco Geppi (President GIDRM, University of Pisa, Italy): Closure and Adjournment