

# Development of thin flexible metamaterials as add-ons to MRI-scanners for making MRI more efficient, affordable, and accessible – iHUB DivyaSampark (DST)



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This project aims at developing novel artificial meta-structures in the form of thin, flexible metamaterials, capable of boosting magnetic fields by a few orders of magnitude, compatible for use in the clinical MRI machines of 3T, 1.5T, or less. Such add-on devices can improve signal-to-noise ratio (SNR) of MR images and reduce scan time to make MRI more efficient, affordable and accessible.

## Challenges:

- ❖ State-of-the-art metamaterials too bulky to fit in existing 1–2 cm gap between sample and MRI coil.
- ❖ High SNR comes with high SAR
- ❖ Non-flexible: Extra space bet. Sample and Receive coil reduces sensitivity

## Objectives:

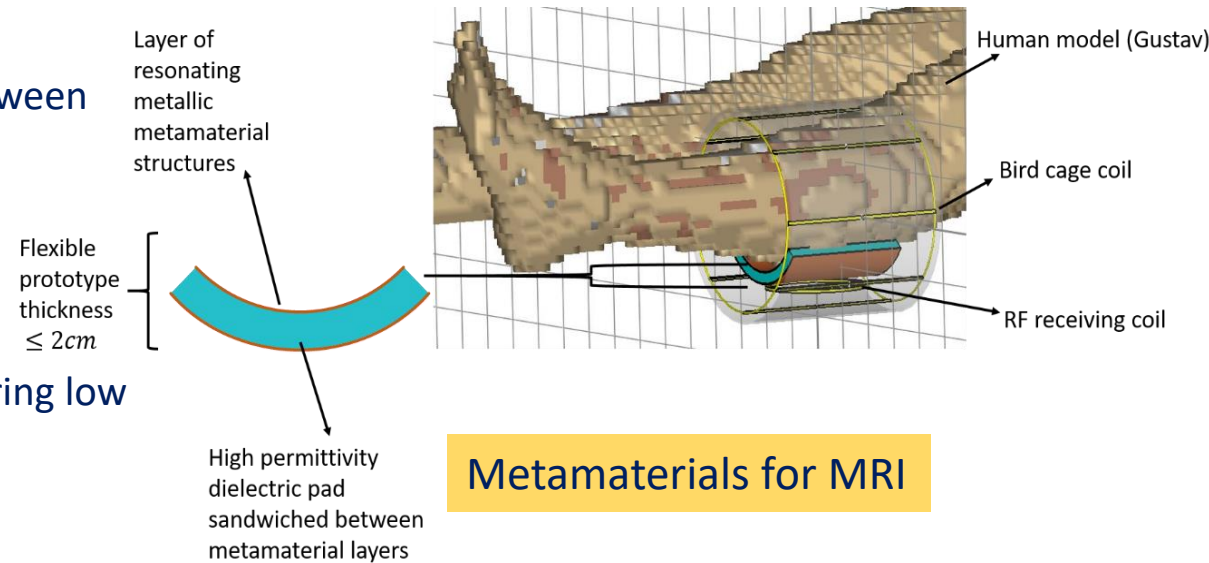
- ❖ Design thin metamaterial add-ons to uniformly boost H-field (SNR) ensuring low tissue heating (SAR)
- ❖ Design flexible wrap-around add-ons for better sensitivity
- ❖ Nullify bending-induced detuning of the ‘wrap-around’ metamaterials

## Deliverables:

- ❖ Develop prototypes and commercialize the technology in collaboration with Industry Partner
- ❖ Patents to secure IP rights and journal articles to disseminate general findings in the field

## Advantages and Impact:

- ❖ Upgradation of existing MRI scanners & add-ons to new scanners
- ❖ Better image or faster scan with low-field scanners
- ❖ Wrap-around add-ons to offer better efficiency and sensitivity of scan
- ❖ Ensure safety for patients with implants



## Current Stage:

- ❖ The project has just initiated