

The promise of a new generation of affordable hybrid technologies exploiting low-field MRI

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Multimodal technologies combining different physical principles have enhanced medical imaging, diagnostic, treatment and monitoring tasks [1]. In hybrid devices, MRI systems are often integrated for their excellent soft-tissue contrast and multidimensional structural and morphological information. Unfortunately, they require cryogenic refrigeration, they are bulky, heavy, environmentally unfriendly, expensive to build, site, operate and maintain, and they ultimately constitute a formidable barrier to the accessibility and democratization of medical devices.

At present, there is a new wave of low-cost and portable MRI devices based on low-field (LF) magnets [2]. The rather undemanding hardware and infrastructural requirements associated to LF-MRI make it an ideal platform to expand the accessibility and applications of MRI beyond the restrictive environment of radiology departments in large clinical centers [3,4]. Moreover, low fields greatly facilitate integration with e.g. PET and US modules, making LF-MRI an auspicious new starting point for hybrid medical devices.

In this talk, I will provide an overview of the state of the art of LF-MRI, and share a vision of a prospective new generation of affordable hybrid technologies.

[1] L. Martí-Bonmatí et al., *Con. Med. & Mol. Im.*, 5.4 (2010): 180-189.

[2] J.P. Marques et al., *JMRI*, 49 (2019), 1528–42

[3] T. Guallart-Naval et al., *Sci. Reps.*, 12 (2022), 1–11

[4] J.M. Algarín et al., *Portable MRI Journal* Vol. 1 Issue 1, (2024)

Field

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