

Molecular imaging using anisotropic gamma emission from hyperpolarised nuclei

The Gamma-MRI project, funded under the EC FET Open Call aims developing molecular imaging capabilities based on gamma-rays emitted in the decay of hyperpolarised nuclei, which show a distinct anisotropy.

Despite significant advances over decades, MRI may still be hindered by low sensitivity, only partially compensated by recent advances in hyperpolarisation. On the other hand, the very sensitive PET and SPECT imaging modalities may be limited in spatial resolution. The proposal of Gamma-MRI is to overcome these limitations by combining the sensitivity of gamma ray detection with the enhanced resolution of MRI, employing magnetic resonance excitation and advanced gamma-ray imaging methods for anisotropic gamma emission from hyperpolarised xenon.

The possible application in clinical environments has stroke as endpoint. Stroke ranks as the second leading cause of death and the third leading cause of disability in the world. To significantly enhance patient outcomes, precise treatment selection guided by images of the ischaemic brain within a narrow time window is imperative. Unfortunately, there is scarce availability of point-of-care molecular imaging technologies to expedite patient management. Gamma-MRI intends to eventually fill this gap.

A preclinical prototype has already been built by the consortium and is currently undergoing extensive tests. The talk will focus on its gamma-ray detection capabilities and the imaging strategies based on anisotropic gamma-ray emission.

Field

Systems and applications

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