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Increasing the acquisition space and dimensionality in microstructural MRI: promises and challenges

Microstructural MRI aims to extract reproducible measures that can be studied across populations and longitudinally. Typically, distinct MRI experiments are performed to probe each individual phenomenon (e.g. diffusion, relaxation, and susceptibility), but each MRI contrast provides only part of the picture. In contrast, the simultaneous multidimensional variation of multiple experimental variables can optimally exploit their joint and complementary information. Moreover, new hardware developments such as ultra-strong gradients enable the exploration of acquisition parameters that are off limits with clinical scanners. This talk will focus on the promises of increasing the acquisition space and dimensionality in microstructural MRI, and challenges related to its efficient exploration within acceptable scan times.