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Magnetic Susceptibility Source Separation for Myelin Imaging

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Myelin imaging has been a long-standing goal in MRI. A recent development in quantitative susceptibility mapping (QSM), called susceptibility source separation, enables the separation of para- and diamagnetic contributions within a voxel, providing valuable information about tissue microstructure. This technique can help disentangle the two major sources of brain susceptibility, iron and myelin, both of which are strongly linked to the pathology of neurodegenerative diseases such as multiple sclerosis. In this presentation, we will begin with an overview of susceptibility source separation approaches, focusing in particular on chi-separation. Next, we will review studies that highlight the association between diamagnetic susceptibility and myelin levels in the brain. Finally, we will discuss possible artifacts and confounding influences that may complicate the interpretation of diamagnetic susceptibility as a reliable indicator of myelin.