Diffusion MRI/NMR magnetization equations with relaxation times DILIP DE, Kaduna State University, Kaduna, Kaduna State, Nigeria, SIMON DANIEL, Mathematics Dept., Kaduna State University, Kaduna, Kaduna State, Nigeria — Bloch-Torrey diffusion magnetization equation ignores relaxation effects of magnetization. Relaxation times are important in any diffusion magnetization studies of perfusion in tissues(Brain and heart specially). Bloch-Torrey equation cannot therefore describe diffusion magnetization in a real-life situation where relaxation effects play a key role, characteristics of tissues under examination. This paper describes derivations of two equations for each of the y and z component diffusion NMR/MRI magnetization (separately) in a rotating frame of reference, where rf B_1 field is applied along x direction and bias magnetic field(B_o) is along z direction. The two equations are expected to further advance the science & technology of Diffusion MRI(DMRI) and diffusion functional MRI(DFMRI). These two techniques are becoming increasingly important in the study and treatment of neurological disorders, especially for the management of patients with acute stroke. It is rapidly becoming a standard for white matter disorders, as diffusion tensor imaging (DTI) can reveal abnormalities in white matter fibre structure and provide models of brain connectivity.

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