

Time delay in chemical exchange during an NMR pulse

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During a radio-frequency pulse in an NMR (nuclear magnetic resonance) experiment there is in general a combination of three processes: excitation, precession and relaxation of the spin magnetic moments. For a set of chemically exchanging nuclear magnetic moments also chemical exchange has to be considered. In this work we consider the behavior of a two-site chemically exchanging system during a radio-frequency pulse in an NMR experiment, and analyse it for the generalized case of exchange with a time delay.

The exchanging system is described by a set of linear delay differential equations, and the equations are solved by application of the Laplace transform. The solutions for some special cases are studied, and cases of oscillating and non-oscillating solutions are discussed.

References

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