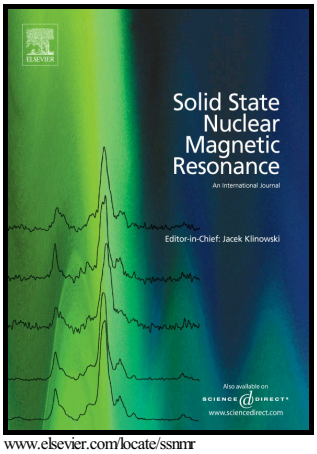
Quadrupolar solid-state NMR and repetitive experiments: some aspects in the Liouville space. Application to spins I=1

Christophe Odin



www.elsevier.com/locate/ssnmr

PII: S0926-2040(16)30110-2
DOI: http://dx.doi.org/10.1016/j.ssnmr.2016.12.012
Reference: YSNMR765

To appear in: *Solid State Nuclear Magnetic Resonance*

Received date: 28 October 2016
Revised date: 20 December 2016
Accepted date: 27 December 2016

Cite this article as: Christophe Odin, Quadrupolar solid-state NMR and repetitiv experiments: some aspects in the Liouville space. Application to spins I=1, *Soli State Nuclear Magnetic Resonance* http://dx.doi.org/10.1016/j.ssnmr.2016.12.012

Quadrupolar solid-state NMR and repetitive experiments : some aspects in the Liouville space. Application to spins I=1.

Christophe ODIN

[1] *Institut of Physics of Rennes IPR/UMR CNRS 6251, University of Rennes I, Campus de Beaulieu, Bat 11A, 35042 Rennes Cedex, FRANCE*

Abstract

The aim of this work is to generalize the Ernst-Anderson model developed to account of the steady-state regime of isolated spins I=1/2 subject to a train of strictly identical pulse sequences separated by free evolution periods of same duration. We generalize this model to the general case of spins I≥1 and general pulse sequence within the framework of the Liouville space. In particular, it is proved that under reasonable assumptions, a well defined steady-state regime is reached which is independent of the initial conditions. The general formal expressions obeyed by the steady-state density operator are given as a function of pulse propagators and relaxation operator for single and two-pulse sequences. In solid-state NMR where recycle time can be made, at the same time, much longer than typical coherence relaxation times and smaller than typical population relaxation times, further simplification leads to more tractable formula. As an example, the formalism is applied to I=1 spins with hard and soft single pulse sequence, or to the solid echo se-

Email address: christophe.odin@univ-rennes1.fr (Christophe ODIN)