

REVISITING THE AMMONIA HYPERFINE STRUCTURE WITH SPFIT

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The definitive ammonia maser measurements of Kukolich^{1,2} have proven to be vastly useful, with over 100 citations to date. A critical review of this work was published shortly afterwards by Hougen³, who made a few corrections and showed that the hyperfine parameters, which were determined separately for each inversion-rotation transition, were internally consistent and useful for extrapolation. In the present work, the multiple-spin fitting routine, SPFIT, has been utilized to perform a global analysis of the available ammonia maser data. Within this framework many of the parameters given by Hougen become redundant, and the differences are introduced as centrifugal distortion corrections to the fundamental spin parameters. The global fit achieves experimental uncertainty for the relative line centers of the hyperfine-split features with 17 independent hyperfine parameters (15 of which are used for both inversion states simultaneously), the previous work had utilized 37 fitted parameters and 10 parameters fixed at assumed values.

¹ Kukolich S.G., *Phys. Rev.*, 156(1), 83, 1967.

² Kukolich S.G., Wofsy S.C., *J. Chem. Phys.*, 52(10) 5477, 1970.

³ Hougen J.T. *J. Chem. Phys.*, 57(10), 4207, 1972.