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H_2N: Part 3. Experimental considerations ARTHUR S. BRILL, Univ. of Virginia — When nuclear spin-state mixing is present, a wide range of transition probabilities occurs and resonances are subject to a corresponding range of microwave saturation behavior. Simulations exhibit useful effects of experimentally-controlled power and spin-lattice relaxation time (dependent upon sample temperature) to intensify resonances of lower transition probability relative to those with higher. The nuclear Zeeman interaction (proportional to B) perturbs both the energy and state mixing of nuclear levels, thereby affecting the separation and probability of resonances. Of special interest are the fields B_{cross}at which pairs of hyperfine levels (of the ground or the excited electronic state, but not both) draw closest together (A. R. Airne and A. S. Brill, Phys. Rev.A **63** 052511). If B is scanned, one chooses its central value, and hence the microwave frequency, to produce a desired effect upon hyperfine splittings or transition probabilities. For pulsed operation, the same factors affect the choice of fixed B. A spectrometer with microwave frequency scanning at fixed B would be useful for centers like H_2N in which on-diagonal hyperfine energy matrix elements depend significantly upon B.

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