NMR Probes of the Molecular Orientational Dynamics of the Endohedral Fullerene $\text{Sc}_3\text{N@C}_{80}$. JOE MARTINDALE, KRZYSZTOF GORNY, CHARLES PENNINGTON, Department of Physics, The Ohio State University, PAGE PHILLIPS, STEVEN STEVENSON, Department of Chemistry and Biochemistry, University of Southern Mississippi — We report NMR lineshapes and spin-lattice relaxation times for both $^{13}\text{C}$ and $^{45}\text{Sc}$ in the endohedral fullerene $\text{Sc}_3\text{N@C}_{80}$. The data show rapid reorientation of the molecule with an activated temperature dependence for the motion over the observed temperature range (50 – 350 K). The ratchet to rotator transition found in $\text{C}_{60}$ is not observed in $\text{Sc}_3\text{N@C}_{80}$. The measurements strongly suggest the motion of the encapsulated $\text{Sc}_3\text{N}$ derives from the reorientational dynamics of the $\text{C}_{80}$ cage, however without the $\text{Sc}_3\text{N}$ being fixed to the cage in the motional narrowing regime.