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Estimating the impact of magnetic field fluctuations on the critical dressing mode of the nEDM@SNS experiment. RAYMOND TAT, California Institute of Technology — The neutron electric dipole moment experiment at the Spallation Neutron Source (nEDM@SNS) proposes to measure the nEDM using the spin-dependent capture cross section of neutrons on helium-3. The critical dressing mode of this experiment uses an oscillating magnetic field to dress the gyromagnetic ratios of neutrons and helium-3 to the same value. While this technique grants increased sensitivity to the nEDM by improving the signal-to-noise ratio, this mode of measurement also introduces additional noise from the power supply used to drive the dressing field. This can lead to randomly fluctuating magnetic fields which cause the spins of neutrons and helium-3 to drift apart over time. Here we use second-order time-dependent perturbation theory to compute relaxation and frequency shifts due to power supply noise in terms of the noise power spectrum, and compare these calculations to numerical solutions obtained by integrating the Bloch equations.

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