

One magnetometer - two sensitivities

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Years of research on magneto-optical phenomena led to the development of various types of atomic magnetometers. Generally speaking, atomic magnetometer can be suitable for detecting quasistatic (DC) magnetic fields, as well as oscillating (AC) magnetic fields in a tunable spectral range. Sensitivity for DC and AC detection can vary dramatically. Although different $1/f$ noise contribution in those measurements seems like an obvious explanation for this phenomena, careful analysis show that the difference in sensitivity comes from different response of atoms to those types of fields. Performance of an atomic magnetometer using nonlinear magneto-optical rotation (NMOR) is analyzed both for static and oscillating fields. Sensitivity and bandwidth of the magnetometer is analyzed for different experimental parameters.