

# Determination of comagnetometer response to generic spin coupling

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Self-compensating noble-gas-alkali-metal comagnetometers are precise sensors of arbitrary spin perturbations, including rotations and exotic spin interactions. Accurate estimation of measured quantities, including nonmagnetic couplings, requires precise frequency-dependent calibration of these sensors. We propose a robust and universal method of calibration based solely on the measurements of the response of the comagnetometer to a step change of magnetic field, which can be easily implemented in the experiments. Our results demonstrate that the information inferred from magnetic response correctly predicts the rotational response of the sensor in a wide range of experimental conditions. We will present the theoretical background and detailed calibration pipeline followed by the experimental results.

[1] M. Padniuk, et al., Universal determination of comagnetometer response to spin couplings, *Physical Review Research* **6**, 013339 (2024).