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# Background free detection of BaF for eEDM searches

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The NL-eEDM collaboration aims to probe the CP-violating electron electric dipole moment (eEDM) using BaF molecules [1]. The measurement requires frequency-dependent hyperfine state detection. In the current scheme [2], the fluorescent light is not distinguishable from the probe light, resulting in the scattered light from the probe laser dominating the background. We introduce a new laser induced fluorescence detection scheme, in which molecules are excited to the DΣ state with blue light, and a pair of infrared photons is detected. We will present spectroscopy results of this transition, and evaluate its influence on the sensitivity to the eEDM using BaF.

[1] The NL-eEDM collaboration, "Measuring the electric dipole moment of the electron in BaF", European Physical Journal D 72, 197, (2018)
[2] The NL-eEDM collaboration, "Spin-precession method for sensitive electric dipole moment searches", Physical Review A, 110, (2024)

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