Abstract Submitted
for the MAR17 Meeting of
The American Physical Society

Development of force-detected THz-ESR measurement system and its application to metal porphyrin complexes HIDEYUKI TAKAHASHI, Organization for Advanced and Integrated Research, Kobe University, Japan, TSUBASA OKAMOTO, EIJI OHMICHI, Graduate School of Science, Kobe University, Japan, HITOSHI OHTA, Molecular Photoscience Research Center, Kobe University, Japan — Electron spin resonance spectroscopy in the terahertz region (THz-ESR) is a promising technique to study biological materials such as metalloproteins because it directly probes the metal ion sites that play an important role in the emergence of functionality [1]. By combining THz-ESR with force detection, the samples mass is reduced to the order of ng. This feature is of great advantage because the sample preparation process of biological materials is time-consuming. We developed a force-detected THz-ESR system utilizing optical interferometry for precise cantilever displacement measurement. In order to suppress the sensitivity fluctuation and instability of cantilever dynamics under high magnetic field, the tuning of interferometer is feedback-controlled during a measurement[2]. By using this system, we successfully observed the ESR signal of hemin, which is a model substance of hemoglobin and myoglobin, in THz region.
[1] H. Takahashi, E. Ohmichi and H. Ohta, Appl. Phys. Lett. **107**, 182405 (2015).
[2] H. Takahashi, T. Okamoto, E. Ohmichi and H. Ohta, Appl. Phys. Express **9**, 126701 (2016).

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Date submitted: 29 Nov 2016 Electronic form version 1.4