Abstract Submitted
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An Optogalvanic Flux Sensor for Trace Gases[1] FABIAN MUNKES, PATRICK KASPAR, YANNICK SCHELLANDER, JOHANNES SCHMIDT, ROBERT LOEW, TILMAN PFAU, HARALD KUEBLER, 5th Institute of Physics and Center for Integrated Quantum Science and Technology, University of Stuttgart, DENIS DJEKIC, JENS ANDERS, Institute of Smart Sensors and Center for Integrated Quantum Science and Technology, University of Stuttgart, PATRICK SCHALBERGER, HOLGER BAUR, NORBERT FRUEHAUF, Institute for Large Area Microelectronics and Center for Integrated Quantum Science and Technology, University of Stuttgart, EDWARD GRANT, Department of Chemistry, University of British Columbia — We demonstrate the applicability of a new kind of gas sensor based on Rydberg excitations. From a gas mixture the molecule in question is excited to a Rydberg state. By succeeding collisions with all other gas components this molecule becomes ionized and the emerging electron can be measured as a current, which is the clear signature of the presence of this particular molecule. As a first test we excite Alkali Rydberg atoms in an electrically contacted vapor cell [1,2] and demonstrate a detection limit of 100 ppb to a background of N_2. We employ our gas sensing scheme to the detection of nitric oxide at thermal temperatures and atmospheric pressure [3]. We show first results of cw spectroscopy of the $A\,^2\Sigma^+ \leftarrow X\,^2\Pi_{1/2}$ transition in nitric oxide. [1] D. Barredo, et al., *Phys. Rev. Lett.* **110**, 123002 (2013) [2] J. Schmidt, et al., SPIE **10674** (2018) [3] J. Schmidt, et al., *Appl. Phys. Lett.* **113**, 011113 (2018)

[1]FET Quantum Technologies Flagship: macQsimal

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