Abstract Submitted
for the DAMOP19 Meeting of
The American Physical Society

An optogalvanic flux sensor for trace gases PATRICK KASPAR, JOHANNES SCHMIDT, FABIAN MUNKES, 5th Institute of Physics University of Stuttgart, DENIS DJEKIC, Institute of Smart Sensors University of Stuttgart, PATRICK SCHALBERGER, HOLGER BAUR, Institute of Large Area Microelectronics University of Stuttgart, ROBERT LOEW, TILMAN PFAU, 5th Institute of Physics University of Stuttgart, JENS ANDERS, Institute of Smart Sensors University of Stuttgart, NORBERT FRUEHAUF, Institute of Large Area MicroelectronicsT University of Stuttgart, EDWARD GRANT, Department of Chemistry, University of British Columbia, HARALD KUEBLER, 5th Institute of Physics University of Stuttgart — 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 gets ionized and the emerging electron and ion can then 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. For a real life application, we employ our gas sensing scheme to the detection of nitric oxide at thermal temperatures and atmospheric pressure **[3].** We are planning to reduce the detection limit to 1 ppb using state of the art cw lasers for the Rydberg excitation of NO. This is a competitive value for applications in breath analysis and environmental sensing. [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)

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Date submitted: 31 Jan 2019 Electronic form version 1.4