# An optogalvanic flux sensor for trace gases

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We demonstrate the applicability of a new kind of gas sensor based on Rydberg excitations. From an arbitrary probe gas 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 sensitivities down to 100 ppb on a background of N2. We investigate different amplification circuits, ranging from solid state devices on the cell to thin film technology based transimpedance amplifiers inside the cell [3]. For a real life application, we employ our gas sensing scheme to the detection of nitric oxide in a background gas at thermal temperatures and atmospheric pressure.

## References

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