

PROGRAMME & ABSTRACTS

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First Results of Cavity Ring down Signals from Exhaled Air

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Human breath analysis is known as a non-invasive diagnostic method to detect different diseases. Human breath contains many volatile organic compounds (VOC) in very low concentration. Our goal is to create system for diagnostics of the early stage lung cancer by detecting biomarkers of the disease in the exhaled air. We have built a cavity ring-down system (CRDS) that would allow detecting low intensity VOC signals. Cavity ring down spectrometry is a very sensitive spectrometric technique that avoids typical absorption sensitivity limitations. This method allows detecting low signals in a real time without preconcentration. Our CRDS is a portable system that works in UV region with the pulsed Nd:Yag laser at 266 nm [1]. The core part of the CRDS system is a resonator with high reflectivity mirrors at the both ends. A PMT and an oscilloscope register the CRDS signals. The breath samples are collected in the bags. The bags are attached to the CRDS system and the air is pumped into resonator. The concentrations of biomarkers are calculated from the exponential fit to the ring-down signal. In our experiment, first results from breath samples from volunteers after doing different activities were collected and examined. Influence of the smoking on the breath signals also was examined. An example of the signal of exhaled air before and after physical activity is shown in Fig. 1.

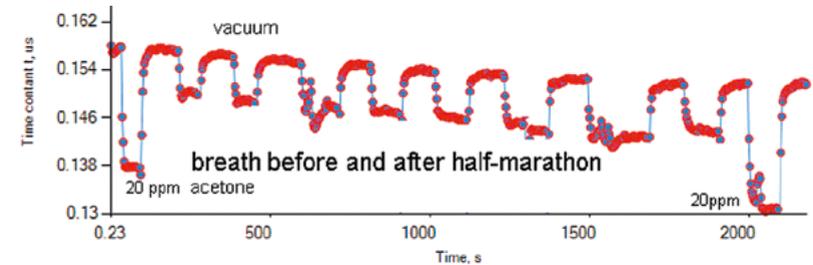


Fig. 1. An example of the CRDS breath signal from the volunteer: before and after half – marathon.

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[1] G. Revalde et al, Cavity Ring-Down Spectroscopy measurements of Acetone concentration, IOP Conf. Series: Journal of Physics: Conf. Series 810 (2017) 012036.