

# Wide-band laser photo-acoustic spectroscopy and machine learning for breath air analysis

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The report is devoted to applications of wide tuning range photo-acoustic laser spectroscopy and machine learning for breath air analysis to detect a specific disease. Breath air analysis can be conducted through the chemical-composition-based and pattern-recognition-based approaches. For the former approach implementation, we use deep neural networks [1] and original chemometrics' methods: (a) a combination of the standard addition method with multivariate curve resolution called HAMAND [2]; (b) criterium based on reducing a spectrum complexity (RSC) [3] to provide exhaled air chemical composition. The latter approach is typical for supervised machine learning algorithms. We will compare both approaches.

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## References

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