

**MRSMATLAB2.0 – MODULES FOR MRS MODELING INVERSION AND DATA-PROCESSING**

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**Abstract:** The method of surface-NMR has shown a dynamic evolution over the past few years. It has grown from a new technology with only a spare number of people that mostly focused on research to a community of universities, research centers and companies providing groundwater service. This development came along with new instrumentation that now allow for multi-channel recording, reference-based noise cancellation, short dead times, and high sampling rates to record the original time series oscillating at Larmor frequency instead of recording its envelope at a low sampling rate.

We present matlab based modules for MRS Modeling, Inversion, and Data-Processing that are a further development MRSmatlab. MRSmatlab2.0 supports data import for all currently available commercial surface-NMR systems (Iris Instruments Numis, RadicResearch NMR-Midi, Vista-Clara GMR). It is a modular toolbox that consists of signal processing, forward modeling, and inversion modules. Each module can be used individually, or managed jointly from a workflow module. The most significant change to MRSmatlab is the signal processing module now providing detailed data inspection and processing, including spike removal, digital filtering that preserves phase properties, envelope calculation, and—most importantly—noise cancellation using reference channels. The inversion is based on the recently introduced QT-Inversion approach with improved performance, now also supporting complex inversion of surface-NMR data. Finally, state-of-the-art  $T_1$  modeling and basic  $T_1$  inversion are introduced.

**No full paper available.**