MassiveOES: Open source software – bringing big data processing to spectroscopy

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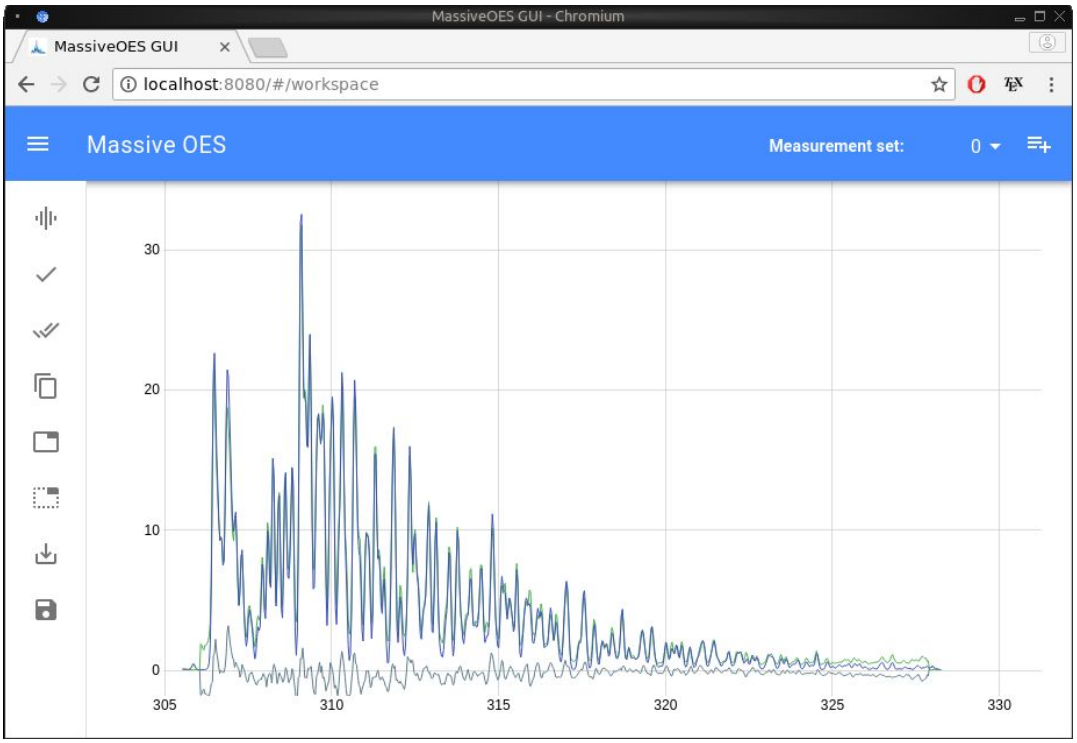

Figure 1. The simple user interface of MassiveOES. OH(A-X) spectrum from microwave atmospheric pressure plasma jet is show as an example.

Already for a few decades, acquisition of spectroscopic data can be very efficient. The combination of CCD chips (or intensified CCDs for precise timing) with imaging spectrographs allows the experimenters to acquire gigabytes of data in a single measuring session. Processing large amounts of spatially or temporally resolved spectra of often overlapping contributions requires a sophisticated and time-efficient approach.

MassiveOES is software developed specifically for the analysis of optical emission spectra of plasma discharges, including batch processing, where best fitting parameters for one spectrum are used as initial estimate for the next one. A special plugin for state-by-state fitting with rotational and fine-structure resolution allows efficient and precise construction of Boltzmann plots for environments with non-thermal distributions.

The spectral databases used by MassiveOES are in the form of SQL files. Currently, the databases for OH(A-X), N_2(C-B), NH(A-X) and N_2^+(B-X) in the near UV spectral region are available. The users are encouraged to create their own spectral databases with the support of the developers.