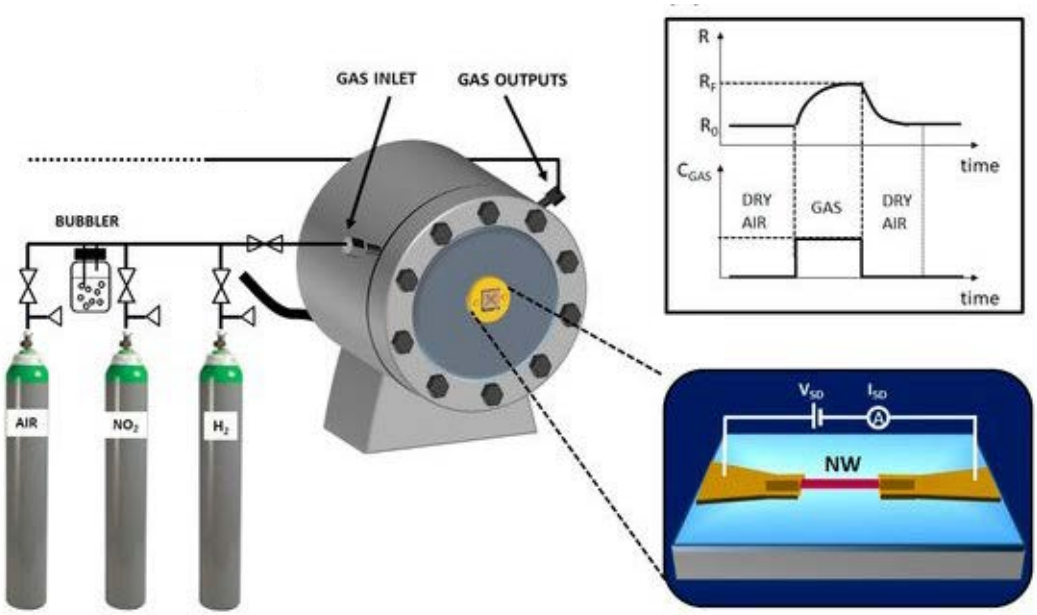
**Biophysical methods for noise analysis in conductometric nanowire sensors**

*The fluctuations in the signal of nanowire-based gas or moisture sensors can arise from fluctuations in the number of molecules interacting with the device and on the details of these interactions. Algorithms inspired by brightness and number (B&N) analysis in fluorescence imaging and by fluorescence correlation spectroscopy can help understanding their origin and set some constraint on the functioning mechanism of the sensors. Techniques based on the variance vs intensity graphs and on time-autocorrelation of the signal will be applied to the quantitative analysis of the noise in conductometric sensors based on individual III-V semiconductor nanowires.*

- Semiconductor nanowires are grown by chemical beam epitaxy, isolated onto a substrate, and used to fabricate electronic devices. (Collaboration with Prof. Lucia Sorba); these devices are tested in different environmental condition and upon exposure to different gases.
- The time-dependence of the signal and of its fluctuations are analyzed and modeled by developing suitable algorithms.

*Main topics of investigation include, but are not limited to:*

1) Implementation/development of suitable data analysis algorithms (MatLab, Python, Origin).
2) Application of these algorithms to existing data.
3) Proposal of novel experiments for studying the functioning mechanisms of nanowire-based devices for sensing, in particular by dissecting the different source of noise/fluctuations.
4) Semiconductor nanowire-based device fabrication using nanolithography techniques.
5) Charge transport measurements in nanowire-based devices for sensing.
6) Development of novel schemes for conductometric nanowire sensors.

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