1 Appendix A

The two neurons A and B were stimulated simultaneously with IIA as odorant to obtain, with the *calcium imaging* technique, couples of time series for this study. This is a standard technique to study neuronal activity, whose application has been discussed in more details in a previous work [1]. The time series represents the neurons' variation of fluorescence, which is a marker of the calcium's concentration in the cells. In particular when a neuron is activated the calcium ions increase (and so does the fluorescence). When instead it is deactivated, the ions concentration (and the fluorescence) decreases. By collecting the fluorescence's variation in time one can evaluate the activation of neurons. When there's no olfactory stimulus, A is active and suppresses B (high florescence for the A signal and low for B). When some odorant is present A is deactivated and as a consequence B isn't suppressed anymore (low fluorescence for the A signal and high for B): the signals will be in anti-phase. This on and off behaviour itself is a proof that there is a relation between them, since the activation or deactivation of A determines the conduct of B.
In Figure 1 an example of the two signals from A and B collected with an olfactory stimulus handed out one time is shown. The signals have also been obtained using a different concentration of the same olfactory stimulus,repeating ten times for both stimuli in different experiments and with their alternation ten times in the same experiment.

[1] Grassmann G., *Causalità di Wiener-Granger applicata a serie temporali estratte da C. elegans*, Tesi di Laurea in Fisica, Univeristà degli studi di Trieste, Settembre 2019.