

What physics research has in common with nightclubs.

Light is always present. Not only to brighten our lives, but also in research of fundamental physical phenomena. This dates back, to when Newton used a prism to decompose the sun light into its components, meaning he reproduced, what we see on a sunny and rainy day: a rainbow. One of the most important scientific inventions in the investigation of light and matter, is the laser. A dangerous apparatus which can be tuned to generate, high power light with a specific colour. The laser is occasionally used in a large scientific field, fluorescence lifetime imaging, which is the temporal study of fluorescence. A process in which a material starts glowing, after being bombarded with the light of the laser.

A major problem in analysing these processes nowadays is called stray signal. Imagine, for example, you are standing in a nightclub and you are trying to have a conversation with your friend. You are standing close enough to him, so you should hear him clearly. The problem is that other people and the music are so loud you can not understand your friend. This problem of environment-noise is analogous to stray light. It covers any light, which you capture during your experiment, that is not from your friend - your experiment. The noise can come from anywhere. A large contribution originates from the different components in the experiments set-up.

My work will require using a laser to make a colourful dye glow and I will test a technique to reduce the unwanted interferences. The technique will involve giving all the glowing light of the dye a name tag, and later, in a computer, I can extract from the contaminated data only the part which has this tag.