# The description of the research project entitled „Development of new class of fluorophores based on boron centre with tailored photophysical properties”

There are a number of reasons why the research on luminescent materials should be guided. This type of materials is useful for humankind for a long time due to the various reasons. This is true not only from the economic point of view but also, more importantly, from the safety of society point of view.

There is a number of materials that are needed by humankind, but those that are especially important are materials that are able to interact with light. Such substances are used in medicinal sciences, bioimaging, light harvesting solar cells but also in OLED devices. The topics of the current research proposal is focused on the synthesis of organic compounds and full characterisation of their molecules, which means their geometry and composition. Next, the measurements of their photophysical properties will be guided including the reactivity and the possibility of the light emission and the possibility of movements of fragments of molecules and the photophysical effects associated to those movements. These studies will deliver the number of information about preparation of new molecular sensors that could be used next in medicine, pharmacy and also in OLED devices.

The project’s workflow is divided into parts of which the first one is the organic synthesis of new dyes. These compounds will be obtained in organic synthesis laboratories, purified and their structure confirmed by instrumental methods. Next the compounds will be studied by advanced spectroscopic techniques. The results will be compared to the quantum-chemical calculations in order to better understand the mechanisms of action of new dyes. If needed the process will be repeated in order to obtain the compounds that fulfil the needed properties.

The effects of the project implementation will be the major understanding of mechanisms that are responsible for properties of “small bricks” of materials. Thanks to its understanding the properties of materials may be tuned in a predictable way.