

Bartłomiej Kiczek

Tytuł rozprawy doktorskiej: **Structures and traces of dark matter in different physical systems – from condensed matter to black hole physics**

Streszczenie w języku angielskim:

This thesis is concerned with several scenarios of non-gravitational interactions between dark matter (represented by dark photons and axions) and visible matter, which were investigated using a similar theoretical framework.

Using the general relativity with different matter contributions we modelled, i. a. , the structures around black holes -- both visible and dark -- and showed possible implications on their physics generated by interaction terms between two kinds of matter.

The thesis consists of two parts, first provides an introductory material to the conducted research. The second one collects the articles, published in peer-reviewed scientific journals, being the substantive scientific contribution of this dissertation.