In the few year period preceding the submission of this application, the research group at the Institute of Physics of the Jagiellonian University made significant advances in the understanding of the physics of few nucleon systems and in the development of computation techniques related to those systems. Physical systems of this type are used to test nuclear force models derived from *Chiral Effective Field Theory* ChEFT. This theory is related to the standard model and for this reason few nucleon systems are of great interest among researchers in fields related to the elementary ingredients of matter.

The character of the work is theoretical. The central element of this work revolves around creating numerical implementations of quantum mechanical calculations related to few nucleon systems. Another important element consists of complicated analytical calculations that require the use of symbolic programming within the *Mathematica*® package.

One of the main project objectives is the further development of the, so called, „three-dimensional" formalism. This formalism make it possible to carry out precise calculations for physical cases where more traditional methods fail to provide accurate predictions. This in turn may allow for a more precise verification of newly derived nuclear force models. Another important objective is to create software that would allow the easy construction of numerical implementations of calculations that use partial wave decomposition. This is a relatively old method but, to this day, partial waves are a very important tool in nuclear physics.