

The thesis explores the possible presence of exciton interaction in phycobilisomes, the large pigment-protein light-harvesting complexes occurring mainly in cyanobacteria. The technique of two-dimensional electron spectroscopy, which provides a resolution on the femtosecond scale and is sensitive to exciton interactions, was used to study phycobilisomes of cyanobacteria *thermosynechococcus elongatus*. A possible model of energy levels of phycobilisomes and the flow of excitatory energy between them was constructed from the obtained data measured on the spectral range of approximately 590 to 700 nm. The data indicate the likely presence of exciton interaction between 3 pairs of electron states.