Report on the work of the dissertation council

Dissertation Council at NPA "K. Zhubanov Aktobe Regional University" in the direction of training PhD and doctoral candidates in the profile 6D060400 – 8D05301 – Physics.

By the decision of the Academic Council of the NAO "K. Zhubanov Aktobe Regional University" dated May 20, 2022, protocol No. 12, the permanent composition of the dissertation council for the specialty 6D060400 - 8D05301 - Physics was approved (order No. 368-N dated 05/24/22):

Shunkeyev Kuanyshbek Shunkeyevich - Doctor of physical and mathematical Sciences, Professor, Chairman of the Dissertation Council, Hirsch index -11;

Sergeyev Daulet Maksatuly - candidate of physical and mathematical sciences, Professor, Deputy Chairman of the dissertation council, Hirsch index -10;

Sagimbayeva Shynar Zhanuzakovna - candidate of physical and mathematical sciences, Associate Professor, Scientific secretary of the dissertation council, Hirsch index - 7.

Kislitsyn Sergey Borisovich - candidate of physical and mathematical sciences, Member of the dissertation council, Professor at the Institute of Nuclear Physics (Almaty, Kazakhstan), Hirsch index - 9;

The Dissertation Council is authorized to accept dissertations for defense in the specialty 6D060400 – 8D05301 – Physics.

The report contains the following information:

1. Data on the number of meetings held.

In 2022, "Physics" Dissertation council held 1 (one) meeting.

2. Last names, first names, patronymics (if any) of the members of the dissertation council who attended less than half of the meetings.

None.

3. List of PhD students with indication of the educational organization.

No	Full name	Educational organization
1	Maratova Aida Gafurkyzy (defense was held on June 30, 2022)	K. Zhubanov Aktobe Regional University

4. A brief analysis of the dissertations reviewed by the council during the reporting year, highlighting the following sections:

4.1. Analysis of the topic of the PhD student A. G. Maratova's work:

The dissertation titled "The features of spectroscopic properties of CsI, RbI, KI, and KCl single crystals with decreasing lattice symmetry" is dedicated to studying the nature of the luminescence of self-trapped excitons (STE) under

uniaxial elastic deformation, which lowers the lattice symmetry at low temperatures, as well as the mechanisms of radiation-induced defect formation in CsI, RbI, KI, and KCl crystals.

The effect of exciton self-trapping under elastic deformation not only allows for the identification of the intrinsic luminescence properties of alkali halide crystals (AHC), but also opens the possibility of influencing the configuration of the STE state before its decay through deformation.

Thus, uniaxial deformation, which reduces lattice symmetry, provides experimental opportunities to influence the migration and self-trapping of excitons, which are sensitive to the symmetrical arrangement of the crystal-forming particles.

CsI, RbI, KI, and KCl crystals were intentionally chosen as objects of study. On the one hand, these are well-studied crystals, and the main principles of STE relaxation have been thoroughly analyzed for them. However, these crystals differ significantly in many properties, including the efficiency of STE migration, the efficiency of deformation-induced defect formation, and their radiation sensitivity, among others. According to our experimental capabilities, at 80 K, the average free path of anion excitons in a series of crystals, CsI (350 a, where a is the lattice constant) → KI (235 a) → RbI (150 a) → KCl (2 a), is crucial for simultaneously studying the processes of self-trapping, luminescence properties, and the efficiency of radiation-induced defect formation in alkali halides.

Thus, by selecting these crystals (CsI, RbI, KI, and KCl) as research objects, it is possible to identify both the peculiarities of electron radiation relaxation and the formation of radiation defects stimulated by low-temperature uniaxial deformation.

In this regard, the key scientific problem determining the relevance of the chosen topic is finding ways to directly influence the pre-decay states of STE, which allows for the targeted control of both the luminescence channel and the STE decay channel efficiency.

4.2. In accordance with paragraph 3 of Article 18 of the Law "On Science," the relevance of dissertation topics established by the Higher Scientific and Technical Commission under the Government of the Republic of Kazakhstan to the development directions of science and/or state programs.

The dissertation was carried out in accordance with the topic of the scientific project funded by the Ministry of Education and Science of the Republic of Kazakhstan under the grant funding program for 2020-2022, IRN AR08855672 "Scientific Research in the Field of Natural Sciences," within the priority area of scientific development, and the specialized scientific area of "Fundamental and Applied Research in Physics and Astronomy," specifically on alkali halide crystals under the project titled "Functional Impact on Radiation Relaxation of Electronic Excitations Aimed at Improving the Luminescent Properties of Materials." It was also completed in alignment with the grant funding project for young scientists for 2021-2023, IRN AR09057911, titled "Experimental Study of Luminescence Mechanisms in KI, RbI, and CsI Crystals under Activation by Homologous Cations and Low-Temperature Deformation."

4.3. Dissertation results in practice fulfillment level analysis .

A unique method for synchronously recording the time and spectral dependencies of the tunneling luminescence intensity in alkali halide crystals (AHC) was developed (Patent for a utility model of the Republic of Kazakhstan No. 6563, dated 22.10.2021). A certificate was obtained for the inclusion of data on digitally recording the spectra of photoluminescence, X-ray luminescence, tunneling luminescence, and thermally stimulated luminescence of AHC into the State Register of copyright-protected objects (Certificate No. 12826, dated 26.10.2020).

The intellectual products from studying the relaxation of electronic excitations (EE) in AHCs with reduced lattice symmetry form the scientific basis for the development of scintillation detectors based on AHCs. In AHC scintillators, the primary mechanism for transferring absorbed ionizing radiation energy to luminescence centers is associated with the formation of exciton-like excitations, whose migration to activators leads to the efficient excitation of scintillations.

Based on the dissertation materials, 11 publications were released, including 2 articles in journals indexed in the Web of Science database: *Nuclear Instruments and Methods in Physics Research* (IF = 1.210, quartile = Q3, percentile = 51), 3 articles indexed in the Scopus database: in the journal *Integrated Ferroelectrics*, *Eurasian Journal of Physical and Functional Materials*, *Low Temperature Physics* (CiteScore = 1.3, percentile = 28), and 1 article in scientific publications included in the list recommended by the Committee for Quality Assurance in Education and Science of the Ministry of Education and Science of the Republic of Kazakhstan. Additionally, a patent for a utility model and one copyright certificate were obtained.

5. Analysis of the work of official reviewers (with examples of the worst quality reviews).

Reviewers for the dissertations of doctoral candidates seeking the Doctor of Philosophy (PhD) degree were appointed in accordance with the requirements of the standard regulations on the dissertation council. Information about the appointed reviewers is provided below:

No	PhD student	Reviewers	
1	Maratova Aida Gafurkyzy	Prikhodko Oleg Yuryevich - PhD, professor, Al-Farabi Kazakh National University (Almaty, RK), specialty 04.01.07.	Dauletbekova Alma Kabdenovna - PhD, Professor of the Technical Physics Department of L.N. Gumilev Eurasian National University (Astana, RK), specialty 01.04.07.

The reviewers, Doctor of Physical and Mathematical Sciences, Professor O. Prikhodko, and Candidate of Physical and Mathematical Sciences, Professor A.K.

Dauletbekova, conducted a comprehensive analysis of the processes of electronic excitation decay in the crystals studied under the influence of uniaxial elastic deformation. The reviewers are highly qualified specialists in the field of condensed matter physics, specifically related to the dissertation topic of A.G. Maratova.

There are no comments regarding the reviewers' work.

6. Proposals for further improvement of the system of training scientific personnel.

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7. The number of dissertations for the degrees of Doctor of Philosophy (PhD), Doctor of Science in the field, broken down by areas of personnel training:

	Specialty 6D060400 – 8D05301 – Physics
1) dissertations accepted for defense (including PhD students from other universities)	1 (one)
2) dissertations withdrawn from consideration (including those of PhD students from other universities):	-
3) dissertations that received negative reviews from reviewers (including PhD students from other universities):	-
4) dissertations with a negative decision following the defense (including PhD students from other universities)	-
5) dissertations submitted for revision (including PhD students from other universities)	-
6) dissertations submitted for re-defense (including PhD students from other universities)	-

Chairman of the dissertation council _____ K.Sh. Shunkeyev

Scientific Secretary of the Dissertation Council _____ Sh.Zh. Sagimbayeva

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