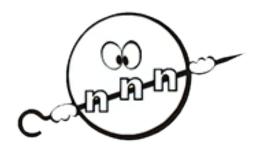
31st International Seminar on Interaction of Neutrons with Nuclei: Fundamental Interactions & Neutrons, Nuclear Structure, Ultracold Neutrons, Related Topics (ISINN-31)



Contribution ID: 62 Type: not specified

## Study of the Wall Painting from the Vladychaya Palata of the Novgorod Kremlin (Velikiy Novgorod, Russia) Using Complementary Physico-Chemical Methods

Thursday, 29 May 2025 14:20 (15 minutes)

This work presents the results of a comprehensive study that applied complementary physico-chemical methods to 29 mural fragments from the Vladychnaya Palata in the Novgorod Kremlin. Plaster samples were subjected to neutron activation analysis (NAA) at the WWR-K research reactor (Institute of Nuclear Physics, Kazakhstan) to determine elemental composition. The pigment composition of the paintings was studied using a combination of methods: X-ray fluorescence analysis, micro-Raman spectroscopy, as well as optical and polarized microscopy.

NAA results were statistically treated. K-means clustering revealed two groups of plaster samples. Comparing the statistical treatment results with the pigment composition revealed a richer palette of pigments for one of the sample groups. Visualization of the k-means clustering results with color coding of samples clearly demonstrates the differences between the groups.

Combining results of complementary physico-chemical methods enabled a detailed characterization of the materials used in the wall painting of the Vladychnaya Palata. This data can serve as a basis for further studies in the fields of art history, restoration, and preservation of cultural heritage of Novgorod.

**Primary authors:** LOBACHEV, Valerii (JINR); DMITRIEV, Andrey (JINR); PHILIPPOVA, Olga (JINR); LENNIK, Svetlana (INP, Kazakhstan)

Presenter: LOBACHEV, Valerii (JINR)

Session Classification: Parallel Session 4: Nuclear and related analytical techniques in environmental

and materials science

Track Classification: Parallel session: Parallel session 4