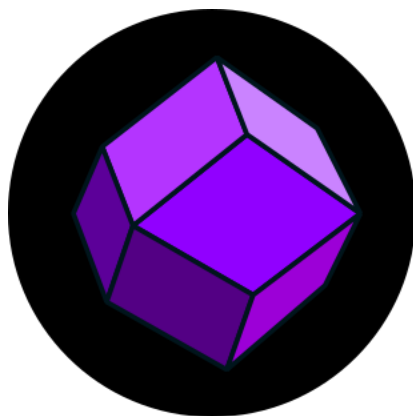


Petersburg Perovskites – 2024



Book of Abstracts

St. Petersburg, Russia
15-17 May, 2024

Petersburg Perovskites – 2024

2nd SPbU Summer School and Conference on Halide Perovskites

The international online summer school and conference is dedicated to the novel photonics material – halide perovskites. At this three-day school, students and young scientists will have the opportunity to hear lectures from the world's leading scientists involved in fundamental research on the physics and chemistry of halide perovskites and their low-dimensional analogues, as well as related technologies and their applications in various fields of optoelectronics and photonics.

The school is held online in Zoom for three days – **May 15-17, 2024**, with school lectures, invited lectures and participant talks.

The school is organized by the Photonics of Crystals laboratory of St. Petersburg State University, Russia (crystal.spbu.ru) and supported by the Ministry of Science and Higher Education of the Russian Federation (Megagrant no. 075-15-2022-1112).

Program committee:

- Constantinos Stoumpos, SPbU and University of Crete (Greece)
- Alexei Emeline, SPbU
- Yury Kapitonov, SPbU

School secretary:

Aleksei Murzin, SPbU (a.murzin@2015.spbu.ru)

Web-site: <https://crystal.spbu.ru/conferences/pepe2024.html>

School program (Moscow time, GMT+3):

Wednesday, May 15, 2024

9:50-10:00		School opening
10:00-11:00	Constantinos Stoumpos , SPbU, Russia	School talk: The evolution of perovskites – from CaTiO_3 to high-performance semiconductors
11:00-11:30	Zhijun Ning , ShanghaiTech University, China	Low dimensional tin perovskite (<i>invited talk</i>)
11:30-11:45		Coffee break
11:45-12:00	Anna Samsonova , SPbU, Russia	Low-temperature refractive index dispersion in MAPbI_3 halide perovskite single crystal
12:00-12:15	Vasilisa Anikeeva , Institute of Spectroscopy RAS and HSE, Russia	High-resolution spectroscopy of hybrid perovskites
12:15-12:30	Anush Badalyan , A. Alikhanyan National Science Laboratory, Armenia	Proton irradiation effects on CsPbBr_3 perovskites thin films
12:30-12:45	Ilya Martynov , MIPT, Russia	Conjugated small molecules: A promising hole transport materials in perovskite photovoltaics
12:45-14:00		Lunch
14:00-15:00	Petr Tolstoy , SPbU, Russia	School talk: NMR of halide perovskites: basic principles and applications
15:00-15:30	Ivan Zhidkov , Ural Federal University, Russia	Improving hybrid perovskites stability for solar cells application in space via B-site cation engineering (<i>invited talk</i>)
15:30-15:45		Coffee break
15:45-16:15	Xujie Lu , Center for High Pressure Science and Technology Advanced Research, China	Pressure-modulated structure-function motifs in two-dimensional halide perovskites and their carrier behavior (<i>invited talk</i>)
16:15-16:30	Matthew Maksimov , SPbU, Russia	Coherent dynamics of excitons in thin GaAs / AlGaAs quantum well

Thursday, May 16, 2024

10:00-10:30	Vasilii Belykh , TU Dortmund, Germany	Coherent spin dynamics of electrons and holes in lead-halide perovskites (<i>invited talk</i>)
10:30-11:00	Dmitry Smirnov , Ioffe Institute, Russia	The squeezed dark nuclear spin state in lead halide perovskites (<i>invited talk</i>)
11:00-11:30	Jing Zhao , University of Science and Technology Beijing, China	Reversible mechanically induced photoluminescence changes in hybrid metal halides (<i>invited talk</i>)
11:30-11:45		Coffee break
11:45-12:00	Vladislav P. Bezverkhniy , LETI, Russia	Investigation of substrates for perovskite quantum dots
12:00-12:15	Vadim O. Kozlov , SPbU, Russia	Nonlinear Faraday effect in rare earth doped glasses
12:15-12:30	Mariia Mamaeva , SPbU, Russia	Observation of biexciton in MAPbCl ₃ single crystal
12:30-12:45	Roman Nazarov , SPbU, Russia	Optical memory based on photon echo with long-lived spin states in a magnetic field
12:45-14:00		Lunch
14:00-14:30	Andrey Aleshin , Ioffe Institute, Russia	Multifunctional structures based on organometallic and inorganic perovskites and their composites (<i>invited talk</i>)
14:30-15:30	Alexei Emeline , SPbU, Russia	School talk: Application of the diffuse reflectance spectroscopy to explore optical behavior of halide perovskites: basic approaches, advantages and problems
15:30-15:45		Coffee break
15:45-16:15	Weijun Ke , Wuhan University, China	All-perovskite tandem solar cells (<i>invited talk</i>)
16:15-16:30	Elena A. Bashegurova , SPbU, Russia	Study of areas of dimensional quantization in GaAs/AlGaAs quantum dots

Friday, May 17, 2024

10:00-10:30	Aleksandra Furasova , ITMO University, Russia	Perovskite solar cells for IoT and IoT applications (<i>invited talk</i>)
10:30-11:00	Alexey Tarasov , Moscow State University, Russia	Perovskite solar cells stability improvement via efficient surface/bulk passivation and encapsulation (<i>invited talk</i>)
11:00-11:30	Ioannis Paschos , Westlake University, China	Strong-coupling utilizing 2D organic-inorganic halide perovskite crystals (<i>invited talk</i>)
11:30-11:45		Coffee break
11:45-12:00	Roman S. Kryukov , LETI, Russia	Optical and electronic properties of carbon quantum dots – organic-inorganic perovskite composite
12:00-12:15	Alena Yu. Mikheleva , SPbU, Russia	Phase transition of solid piperidinium lead trihalides
12:15-12:30	Kamilla M. Konstantinova , MISIS, Russia	Synthesis and research of perovskite single crystals $\text{CH}_3\text{NH}_3\text{PbBr}_3$ (MAPbBr ₃)
12:30-12:45	Ekaterina Deribina , SPbU, Russia	Helicity resolved spectroscopy of unstrained GaAs/AlGaAs quantum dots
12:45-14:00		Lunch
14:00-15:00	Yury Kapitonov , St.Petersburg State University, Russia	School talk: Excitons in halide perovskites
15:00-15:15	Aleksei Murzin , SPbU, Russia	Energy transfer from the orthorhombic to the tetragonal phase and their coexistence in MAPbI ₃ halide perovskite single crystal
15:15		School closing

Low-Temperature Refractive Index Dispersion in MAPbI₃ Halide Perovskite Single Crystal

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The refractive index is one of the main optical parameters of any semiconductor media, including halide perovskites. To model devices, such as laser cavities, it is important to know not only the absolute value of the refractive index, but also its spectral behavior -- the dispersion. In this work, the refractive index dispersion $n(E)$ in the MAPbI₃ (MA⁺ = CH₃NH₃⁺) halide perovskite single crystal is determined in the temperature range from 4 to 88 K by studying the interference of light in a microcavity. It has been shown that in the most practically important transparency region of the material, the dispersion of the refractive index is determined not only by the excitonic transition located nearby, but also by higher-lying interband transitions (Fig. 1).

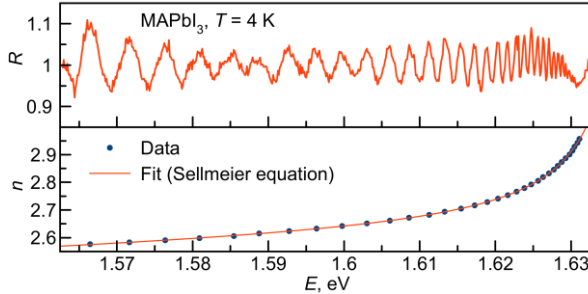


Fig. 1. Reflectivity spectrum of MAPbI₃ microcavity (red curve) at 4 K and its refractive index dispersion (dots) fitted by the Sellmeier equation (line).

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