

# ADVANCED PHYSICS LABORATORIES WORKSHOP: CHALLENGES AND OPPORTUNITIES

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## ABSTRACT

Undergraduate laboratories are an integral part of undergraduate education in science and engineering. A recent American Association of Physics Teachers report on teaching laboratories identified main goals of the undergraduate laboratory curriculum, with learning outcomes focused on: constructing knowledge, modeling, designing experiments, developing practical laboratory skills, collecting, analyzing, and visualizing data, and finally, communicating the results. While significant progress has been achieved in reforming the laboratory components of the introductory-level courses, improving the labs for more specialized upper division physics courses remains a challenge, especially for smaller-size programs and Departments. Obstacles include the cost involved as well as the expertise needed for developing and running highly specialized experiments. This workshop will address the potential ways to overcome some of the challenges. While the offered workshop format does not allow providing a complete immersion-type experience with the advanced labs, workshop participants will be given opportunity to sample the fragments of several essential lab experiments, in a virtual format, and discuss, in the breakout rooms, the sample tasks, questions and data. Some open-source resources for advanced laboratories (both in-class and virtual/remote options) will be shared with the workshop participants.

Intended Audience: Undergraduate Physics Educators

## PRESENTER



Dr. Tetyana Antimirova is an Associate Professor at the Department of Physics, Toronto Metropolitan University (formerly Ryerson University) in Ontario, Canada. She received her PhD from the Institute for Materials Science (Academy of Sciences) in Kyiv, Ukraine, specializing in condensed matter Physics. Since moving to Canada in 1997, her interest shifted to Physics Education Research, with a focus on the impact of educational technologies on students' learning in introductory physics courses. She is a strong advocate for evidence-based physics education, research-informed curriculum design and active learning. Over the course of her career Tetyana has served in a variety of academic roles that include, among others, an undergraduate Medical Physics Program director (twice), and a Science Faculty Teaching Chair. Tetyana is a recipient of an international Desire2Learn Innovation Award for Teaching and Learning from Desire to Learn and the Society for Teaching and Learning in Higher Education (STHLE). She is a current Chair of the C14-Physics Education Commission of the International Union of Pure and Applied Physics.

Proceedings of the IUPAP International Conference on Physics Education, ICPE 2022 5-9 December 2022, page 32, ISBN: 978-1-74210-532-1.