Theoretical Physics Division Seminar

Fundamental Research Department
NATIONAL CENTRE FOR NUCLEAR RESEARCH

25.11.2020 (Wednesday); Time: 11:15

The seminar is held online:
https://www.gotomeet.me/NCBJmeetings/bp2_seminar

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“Lattice gauge theories and cold atomic mixtures”

ABSTRACT:

In the fundamental laws of physics, gauge fields mediate the interaction between charged particles. An example is quantum electrodynamics—the theory of electrons interacting with the electromagnetic field—based on U(1) gauge symmetry. Solving such gauge theories is in general a hard problem for classical computational techniques. While quantum computers suggest a way forward, it is difficult to build large-scale digital quantum devices required for complex simulations. In this talk, I will present our work on analog quantum simulators of a U(1) gauge theory in one spatial dimension. To engineer the local gauge symmetry, we employ inter-species spin-changing collisions in an atomic mixture. We demonstrate the experimental realization of the elementary building block and discuss how it can be scaled to a U(1) gauge theory in one spatial dimension.

Best regards,

T. Altinoluk, *M. Kowal, P. Małkiewicz, E. Sessolo, P. Zin*