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Talk Title: Conductivity spectrum of ultracold atoms in optical lattices

Abstract: In this talk, I will discuss recent experiments performed in J. Thywissen in Toronto and probing the current response of an ensemble of ultracold atoms trapped in an optical lattice to a periodic modulation of the trapping potential. In this experiment, the real and imaginary parts of the associated conductivity are measured as a function of lattice depth, temperature, interaction strength, and atom number. Experimental data is analyzed using complementary approaches, from sum-rules to kinetic theories that allow us to characterize relaxation mechanisms in the cloud. I will discuss in particular how the analysis of the high-frequency behaviour of the conductivity may provide a way to bridge the gap between harmonically trapped and homogeneous systems.