

ESF-Short Visit Grant Report: Martikainen Jani-Petri

Visit to Prof. Dalibard group in ENS, Paris

I visited Prof. Dalibard group in ENS, Paris between 15.10-18.10. The purpose of my visit, was to discuss the recent work I have done in collaboration with Prof. Stoof in Utrecht. This work is related to physics of vortex lines in 1D optical lattices. Prof. Dalibards group is in an excellent position to realize this physical system experimentally and I wished to discuss new prospects as well as possible experimental problems they might face. Such discussion help to keep our theoretical work as relevant as possible for the experimentalist.

During this visit I was introduced, not only to the 1D optical lattice experiment, but also all the four different experimental setups in the group. Therefore, as an added bonus, I learned a fair amount on degenerate fermion experiment, progress on continuous atom laser experiment, and on photo-association experiment. In addition to informal discussions (with theorist as well as experimentalist) related to vortex experiments in optical lattices, I gave a seminar talk on "Quantum physics of vortex lines in 1D optical lattices" for the ENS group.

We concluded that finding the experimentally observable signatures on the 3D structure of the vortex line still requires some work. This is not impossible, but not entirely trivial either. We agreed that if Paris group starts to pursue experiments on a single vortex line, I am ready to assist them in numerical modeling and in finding the most relevant parameter regimes to work with.