

Direct weak localization signatures with ultracold atoms: the CBS revival

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Ultracold atomic systems in presence of disorder have attracted a lot of interest over the past decade, in particular to study the physics of Anderson localization (AL) in a renewed perspective. Landmark experiments have been demonstrated, in 1D [1,2] and 3D [3,4,5,6] geometries. However many challenges remain and new ideas have emerged, as for instance the search for original signatures of Anderson localization in momentum space [7].

Here I will describe our progresses along that line where a weak localization effect has been directly observed, i.e. the Coherent Backscattering (CBS) phenomenon [8]. In particular I will report on the recent observation of suppression and revival of CBS when a controlled dephasing kick is applied to the system [9]. This observation demonstrates a novel and general method, introduced by T. Micklitz and coworkers [10], to study probe phase coherence in disordered systems by manipulating time reversal symmetry of the experimental time sequence.

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