

# Low-dimensional spin-orbit-coupled BECs: Inspirations from semiconductor spintronics

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## Abstract:

The recent experimental realisation [1] of synthetic gauge fields in ultra-cold atom gases [2] has opened up the possibility for studying a host of interesting magnetic-field and spin-orbit-coupling effects for macroscopic quantum states [3]. My presentation will be focussed on two-component (pseudo-spin-1/2) systems that are subject to (pseudo-)spin-dependent gauge fields. As is familiar from semiconductor spintronics [4], the interplay of spin-orbit coupling and confinement results in unusual single-particle properties. Using grey solitons in a ring-trapped BEC as an example, the additional presence of the (in general, pseudospin-dependent) contact interactions in cold-atom gases is shown to enable new types of spin-dependent phenomena [5].

## References:

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