Reentrance behaviour of superfluidity in orbital magnetic fields (part 1/2)

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We study the quantum phase transitions in a system of bosons where the effects of single and pair tunnelling coexist. We map the problem onto the solvable quantum generalisation of the spherical model, which is an improvement of the mean-field theory method. Reentrant behaviour can be observed within the system for sufficiently large density induced tunnelling. It proves both the dissipative character of the influence of the pair phase on single superfluidity and the revival of the latter. Interestingly, the impact of orbital magnetic field effects cannot be anticipated from typical assumptions.