SFB/TRR 21 - Seminar

23. Oktober 2013, Ulm

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Interferometry with non-classical motional states of a Bose-Einstein condensate

We implement an interferometric scheme with non-classical motional states of an elongated 87Rb Bose-Einstein condensate. We isolate a two-level system of transverse motional states and use Optimal Control Theory methods to excite different coherent superpositions. In a previous series of experiments, we created a full population inversion to the first excited state, similar to a pi pulse on the Bloch sphere of the two-level system. In this investigation, we push this technique further and implement series of rotations on the Bloch sphere. We illustrate this concept by realizing a full Ramsey-type interferometric sequence. With this work, we illustrate the feasibility of quantum operators such as needed for any motional states interferometer.

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