

Thermometry for trapped fermionic atoms in the BCS limit

Sunday, 10 September 2023 22:40 (20 minutes)

Measuring the temperature of an interacting fermionic cloud of atoms in the BCS limit represents a delicate task. In the literature temperature measurements have so far been only suggested in an indirect way, where one sweeps isentropically from the BCS to the BEC limit. Instead we suggest here a direct thermometry, which relies on measuring the column density and comparing the obtained data with a Hartree-Fock- Bogoliubov mean-field theory combined with a local density approximation. In case of an attractive interaction between two-components of ${}^6\text{Li}$ atoms trapped in a tri-axial harmonic confinement we show that minimizing the error within such an experiment- theory collaboration turns out to be a reasonable criterion for determining the temperature. The findings are discussed in view of various possible sources of errors.

Primary author: Dr PELSTER, Axel (Department of Physics and Research Center OPTIMAS, RPTU Kaiserslautern-Landau, Germany)

Co-authors: WIDERA, Artur (Department of Physics and Research Center OPTIMAS, Technische Universit\`at Kaiserslautern,Germany); YONG, Sejung (Department of Physics and Research Center OPTIMAS, RPTU Kaiserslautern-Landau, Germany); BARBOSA, Sian (Department of Physics and Research Center OPTIMAS, Technische Universit\`at Kaiserslautern,Germany)

Presenter: Dr PELSTER, Axel (Department of Physics and Research Center OPTIMAS, RPTU Kaiserslautern--Landau, Germany)

Session Classification: Poster Session I

Track Classification: Other