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Local probing and thermometry of a degenerate Fermi gas TORBEN MÜLLER, BRUNO ZIMMERMANN, JAKOB MEINEKE, DAVID STADLER, JEAN-PHILIPPE BRANTUT, HENNING MORITZ, TILMAN ESSLINGER, INSTITUTE OF QUANTUM ELECTRONICS, QUANTUM OPTICS GROUP, ETH ZURICH, SWITZERLAND TEAM — Ultracold atomic gases are ideal systems to study many-body quantum physics. The development of increasingly sophisticated experimental probes now starts to give direct, *in-situ* access to thermodynamic quantities of these systems. We have set up a new apparatus that allows local probing of a degenerate Fermi gas with an optical resolution of 700 nm using a microscope objective. In this talk we will present results obtained by studying *in-situ* atom number fluctuations of an optically trapped gas of degenerate ^{6}Li atoms. In particular, we will discuss the experimental realization of an universal scheme for thermometry recently proposed by Q. Zhou and T.-L. Ho [arXiv:0908.3015v2].

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