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AC electric trapping of neutral atoms ADELA MARIAN, SOPHIE SCHLUNK, WIELAND SCHOELLKOPF, GERARD MEIJER, Fritz-Haber-Institut der Max-Planck-Gesellschaft, Faradayweg 4-6, 14195 Berlin, Germany — We have demonstrated trapping of ultracold ground-state ^{87}Rb atoms in a macroscopic ac electric trap [1]. Trapping by ac electric fields has been previously achieved for polar molecules [2], as well as Sr atoms on a chip [3], and recently for Rb atoms in a three-phase electric trap [4]. Similar to trapping of ions in a Paul trap, three-dimensional confinement in an ac electric trap is obtained by switching between two saddle-point configurations of the electric field. For the first time, this dynamic confinement is directly visualized with absorption images taken at different phases of the ac switching cycle. Stable electric trapping is observed in a narrow range of switching frequencies around 60 Hz, in agreement with trajectory calculations. In a typical experiment, about 3 x 10^5 Rb atoms are trapped with lifetimes on the order of 9 s and trap depths of about 10 μK. Additionally, we show that the atoms can be used to sensitively probe the electric fields in the trap by imaging the cloud while the fields are still on. **References**: 1. S. Schlunk et al., PRL **98**, 223002 (2007) 2. H. L. Bethlem et al., PRA **74**, 063403 (2006) 3. T. Kishimoto et al., PRL **96**, 123001 (2006) 4. T. Rieger et al., PRL **99,** 063001 (2007)

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