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Realization of Bohr-like circular wavepackets JEFF MESTAYER, B. WYKER, F.B. DUNNING, Rice University, C. REINHOLD, Physics Division, Oak Ridge National Laboratory, S. YOSHIDA, J. BURGDÖRFER, Vienna University of Technology — We demonstrate a protocol to create localized wavepackets in very-high n Rydberg states that travel in near-circular orbits around the nucleus. Although these wavepackets slowly dephase and eventually lose their localization, their motion can be followed for several orbital periods. These wavepackets represent the closest analog yet achieved to the original Bohr model of the atom, i.e., an electron in circular classical orbit around the nucleus. The time evolution of the momentum and position of the wavepackets is monitored using, respectively, short half-cycle pulses and sudden field steps, which are applied after a variable time delay and along different directions. The present technique is explained with the aid of CTMC simulations, and possible extension to creation of elusive "planetary atoms" in highly correlated stable multiply-excited states is discussed. Research supported by the NSF, the Robert A. Welch Foundation, the OBES, U.S. DoE to ORNL, and by the FWF (Austria).

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