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A Low-Inductance Ioffe Trap for Antihydrogen Spectroscopy
ERIC TARDIFF, JACK DISCIACCA, STEPHAN ETTENAUER, Harvard University, DANIEL FITZAKERLEY, York University, GERALD GABRIELSE, Harvard University, MATTHEW GEORGE, York University, DIETER GRZONKA, Forschungzentrum Juelich, CHRISTOPHER HAMLEY, Harvard University, ERIC HESSELS, York University, NATHAN JONES, RITA KALRA, KATHRYN MARABLE, MASON MARSHALL, Harvard University, ANDREAS MULLERS, Johannes Gutenberg Universitat Mainz, WALTER OELERT, THOMAS SEFZICK, Forschungzentrum Juelich, CODY STORRY, York University, JOCHEN WALZ, Johannes Gutenberg Universitat Mainz, MATTHEW WEEL, York University, MARCIN ZIELINSKI, Jagiellonian University Krakow, ATRAP COLLABORATION — Experiments at CERN's antiproton decelerator facility have demonstrated the production and trapping of small numbers of cold antihydrogen atoms with confinement times up to 1000 s. The ATRAP collaboration aims to increase the quantity of anti-atoms involved to accommodate both Lyman-alpha laser cooling and 1S-2S spectroscopy of the antihydrogen, so we have undertaken an upgrade to our apparatus centered around an improved neutral-particle confining Ioffe trap that significantly increases the trap depth and decreases the turn-off time while still retaining three-axis laser access. This trap has been tested and is performing close to the design specifications, making us optimistic that we will soon achieve significantly higher numbers of trapped antihydrogen atoms per trial. We will then be in a better position to measure the antihydrogen 1S-2S transition frequency as a precision test of CPT symmetry.

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