Observation of an antimatter hypernucleus

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I report on the first observation of an antimatter hypernucleus, the antihypertriton, $^{3}_{\Lambda}\overline{\mathrm{H}}$, an exotic nucleus consisting of an antiproton ($\overline{p}$), an antineutron ($\overline{n}$), and an antilambda hyperon ($\overline{\Lambda}$). The STAR experiment at RHIC examined interactions produced by colliding beams of gold nuclei at a center-of-mass energy of 200 GeV per nucleon pair. Our analysis yields 70 $\pm$ 17 antihypertritons and 157 $\pm$ 30 hypertritons ($^{3}_{\Lambda}\mathrm{H}$). The lifetime of the combined sample, sensitive to the hyperon-nucleon force, is measured to be $\tau = 182 \pm^{89}_{45} (\mathrm{statistical}) \pm 27(\mathrm{systematic})$ **ps. The measured yields of $^{3}_{\Lambda}\mathrm{H}$ ($^{3}_{\overline{\Lambda}}\overline{\mathrm{H}}$) and $^{3}\mathrm{He}$ ($^{3}\overline{\mathrm{He}}$) are similar, suggesting an equilibrium in coordinate and momentum space populations of up, down, and strange quarks and antiquarks in these collisions, in contrast to the pattern observed in nuclear collisions at lower energies. Our ability to produce and measure these antihypernuclei opens up the study of a new octant in the 3-dimensional chart of the nuclides.**