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Two-stage Rydberg charge exchange in a strong magnetic field MICHAEL WALL, CHRIS NORTON, FRANCIS ROBICHEAUX, Department of Physics, Auburn University — We have performed calculations of two successive charge transfers from Rydberg states in a strong magnetic field. In the first charge transfer, a positron interacts with a highly excited atom to form positronium. In the second stage, the positronium interacts with a cold antiproton plasma to give anti-hydrogen. For many parameters, our results are in qualitative agreement with previous calculations with no magnetic field. However, we do find that there are important changes which may affect the usefulness of the method for efficient formation of anti-hydrogen that can be trapped. For example, some of the the positronium trajectories directly crossed magnetic field lines, whereas initial guesses would be that these light particles would remain fixed to them. Also, a large portion of the resulting anti-hydrogen was found to be in the high magnetic field seeking geometry, which would attract them to the walls of the trap. This causes them to annihilate and, subsequently, reduces the production rate.

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