

Abstract Submitted
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Efficient Production of Rydberg Positronium TOMU HISAKADO, DAVID CASSIDY, HARRY TOM, ALLEN MILLS, UC Riverside, Department of Physics and Astronomy, UC RIVERSIDE DEPARTMENT OF PHYSICS AND ASTRONOMY TEAM — We demonstrated the efficient production of Rydberg Positronium atoms using a two-step incoherent laser excitation process. The two step process occurs first to the $23P$ state and then to the quantum numbers ranging from 10 to 25. We found a 90% efficiency going from the $23P$ state to the Rydberg levels and an overall conversion efficiency of 25% of the production of Rydberg atoms. This high efficiency is due to the overlap of the laser bandwidth with the Doppler broadened width of the $1s-2p$ transition and the suppression of the stimulated emission back to the $2P$ states, due to the intermixing of the Rydberg state Stark sublevels. By demonstrating the production of long lived Rydberg Ps atoms in a high magnetic field may make it possible to perform gravitational measurements of free falling positronium atoms.

Tomu Hisakado
UC Riverside, Department of Physics and Astronomy

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