Abstract Submitted
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Measurement of the Rydberg constant using highly excited positronium atoms DAVID CASSIDY, University College London — Exciting positronium (Ps) atoms to Rydberg states effectively turns off the annihilation process and therefore significantly increases their lifetimes. Since Rydberg atoms may have large electric dipole moments, optically exciting Ps atoms also makes it possible to steer, decelerate, and even trap them using inhomogeneous electric fields. Here I will report the first demonstration of Stark manipulation of Ps atoms, and discuss future applications, including precision spectroscopy of Rydberg Ps levels. By slowing down Rydberg Ps atoms and exciting them to circular states it may be possible to perform optical transitions and measure the Rydberg constant at a useful level of precision. Useful in this context means it could contribute to the ongoing proton radius problem. A measurement of Ps would be a useful addition to other work in this area since the proton-free Ps system can offer a "pure" measurement of the Rydberg constant.

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