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Photoionization of Rydberg atoms in a standing-wave light field SARAH E. ANDERSON, GEORG RAITHEL, University of Michigan — We investigate, experimentally and in calculations, the photoionization of Rydberg atoms in a one-dimensional optical lattice (wavelength 1064 nm). Since the Rydberg atom's size may equal or exceed the lattice period, we are able to sweep the lattice light-field maxima through the volume of the atom. We can thereby determine where the photoionization process occurs inside the atom. We measure photoionization rates for various 85 Rb Rydberg nD states ($45 \le n \le 65$) for various positions of the light maxima relative to the center-of-mass position of the atoms. The measured rates are consistent with photoionization occurring primarily near the atom's nucleus, and not where the Rydberg electron's probability distribution is highest. We present experimental results and discuss them in context with theoretical calculations.

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Sarah E. Anderson University of Michigan

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