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**Coherent Population Transfer in Rydberg Atoms by Multiphoton Adiabatic Rapid Passage<sup>1</sup>**

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It is possible to transfer Rydberg population through up to ten  $n$  states by adiabatic rapid passage through a sequence of  $n$  to  $n+1$  or  $n$  to  $n-1$  transitions using a swept frequency microwave field. However, the microwave frequency sweep must match the changing Kepler frequency. The same population transfer can be effected by a single adiabatic rapid passage through one multiphoton resonance with a much smaller frequency sweep but higher microwave power. The center frequency and power of the microwave pulse are adjusted to select the desired multiphoton transition. The requirements and relative advantages of a multiphoton transition and a sequence of single photon transitions will be discussed. It is a pleasure to acknowledge the contributions of H. Maeda, J. H. Gurian, and D. V. L. Norum to this work.

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