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Four-Wave Mixing and Coherent Processes in Ultracold Atoms Using Intermediate Rydberg States.[1] E. BREKKE, J.O. DAY, L. HARDY, T.G. WALKER, University of Wisconsin - Madison — Continuous 5S-5P-nD two-photon excitation to the Rydberg state was combined with an nD-6P tuned laser to explore coherent processes using intermediate Rydberg states. In a phase-matched geometry, four-wave mixing was demonstrated in good agreement with theory. The directional emission was optimized to 50% for off-resonant Rydberg excitation. Further coherent schemes have been explored using small excitation volumes, showing promise for studying quantum effects in blockaded atom clouds.

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Erik Brekke
University of Wisconsin - Madison

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