

Abstract Submitted
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Pattern Formations for Optical Switching Using Cold Atoms as a Nonlinear Medium¹ BONNIE SCHMITTBERGER, JOEL GREENBERG, DANIEL GAUTHIER, Duke University — The study of spatio-temporal pattern formation in nonlinear optical systems has both led to an increased understanding of nonlinear dynamics as well as given rise to sensitive new methods for all-optical switching. Whereas the majority of past experiments utilized warm atomic vapors as nonlinear media, we report the first observation of an optical instability leading to pattern formation in a cloud of cold Rubidium atoms. When we shine a pair of counterpropagating pump laser beams along the pencil-shaped cloud's long axis, new beams of light are generated along cones centered on the trap. This generated light produces petal-like patterns in the plane orthogonal to the pump beams that can be used for optical switching.

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