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Spin textures in Bose-Einstein condensates AZURE HANSEN, JUSTIN T. SCHULTZ, NICHOLAS P. BIGELOW, University of Rochester — Using a coherent, two-photon Raman spin imprinting technique, we create and characterize a variety of complex, non-equilibrium spin textures, in a ^{87}Rb Bose-Einstein condensate. This Raman technique allows us to engineer the internal and external momenta, superfluid velocities, and spatial spin distribution of the condensate as well as controlling the complex relative phases of the spin components. Spin textures with spatially-varying population distributions in multiple spin states can provide cold-atom analogs of systems in condensed matter, particle, and solid state physics as well as singular optics. A variety of topological excitations can be created, including coreless vortices, fractional vortices, skyrmions, monopoles, and knots.

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