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Knot Solitons in Spinor Bose-Einstein Condensates[1] DAVID HALL, MICHAEL RAY[2], Amherst College, KONSTANTIN TIUREV, EMMI RUOKOKOSKI, Aalto University, ANDREI HORIA GHEORGHE[3], Amherst College, MIKKO MÖTTÖNEN, Aalto University — Knots are familiar entities that appear at a captivating nexus of art, technology, mathematics and science. Following a lengthy period of theoretical investigation and development, they have recently attracted great experimental interest in classical contexts ranging from knotted DNA and nanostructures to vortex knots in fluids. We demonstrate here the controlled creation and detection of knot solitons in the quantum-mechanical order parameter of a spinor Bose–Einstein condensate. Images of the superfluid reveal the circular shape of the soliton core and its associated linked rings. Our observations of the knot soliton establish an experimental foundation for future studies of their stability, dynamics and applications within quantum systems.

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