

Abstract Submitted  
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**Efficient production of spin singlets in lattice-confined spinor condensates**<sup>1</sup> LICHAO ZHAO, ZIHE CHEN, TAO TANG, YINGMEI LIU, Department of Physics, Oklahoma State University — We present an efficient experimental scheme for a production of spin singlets in an antiferromagnetic spinor condensate confined by a cubic optical lattice. Via two independent detection methods, we demonstrate that about 80 percent of atoms in the lattice-confined spinor condensate can form spin singlets, immediately after the atoms cross a first-order superfluid to Mott-insulator phase transition in a sufficiently low microwave dressing field. We also discuss a good agreement between our data and the mean field theory, and two applications of spin singlets in quantum information science.

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Lichao Zhao  
Oklahoma State University

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