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(G*) POS-E38 – Toward a spin-tensor-momentum coupled Bose-Einstein condensate

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The spin state of an electron has a 3-dimensional vector representation. In spin-orbit coupling (SOC), an electron's external momentum becomes linked to its spin vector. This phenomenon appears in many different systems, including atomic and crystal band structure, (quantum) spin-Hall systems, and topological insulators. Previous experiments have used Raman coupling to generate and study several forms of SOC in pseudospin-1/2 ultracold gases. A similar method has been proposed to couple a quantum gas' linear momentum with a spin *tensor* - a representation of a higher (spin-1+) state. While possessing a rich ground state phase diagram, this spin-tensor-momentum coupled system also provides an opportunity to directly observe a dynamical supersolid-like stripe phase with a tunable stripe period. This poster reports our experimental progress toward producing and characterizing this novel state of matter using a Rb-87 Bose-Einstein condensate.

Author: SMITH, Benjamin

Co-authors: TASHCHILINA, Arina (University of Alberta); OOI, Tian (University of Alberta); LINDON, Joey (University of Alberta); COOKE, Logan (University of Alberta); Prof. LEBLANC, Lindsay (University of Alberta)

Presenter: SMITH, Benjamin

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