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**Dynamics of a spin-orbit coupled BEC in a matching lattice**<sup>1</sup> VANDNA GOKHROO, THOMAS M. BERSANO, M. A. KHAMEHCHI, PETER ENGELS, Washington State University — Spin-orbit coupled Bose-Einstein condensates are a powerful tool to investigate advanced condensed matter phenomena. Recently the generation of a supersolid state in this system has created a lot of interest. In our experiments we investigate a spin-orbit coupled Bose-Einstein condensate in the presence of an optical lattice. The lattice wavevector is chosen such that it is matched to the position of the minima in the spin-orbit dispersion. We show the connection between this system and a supersolid state, and describe its quantum dynamics upon sudden quenches. The current status and future directions of this project will be described.

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