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Spin-orbit coupling for ^{87}Rb in the large coupling limit ABIGAIL PERRY, IAN SPIELMAN, Joint Quantum Institute, National Institute of Standards and Technology, and the University of Maryland — We report on the construction of a new atom-chip apparatus for the study of spin-orbit coupling in ^{87}Rb. Previous studies have successfully used Raman dressed spin state potentials to create an effective magnetic field [1]. The previous implementation used momentum transfer from two Raman laser beams to create a double well in momentum space, coupling spin states in the m_f= -1 and m_f = 0 spin states. Instead, our new atom-chip design utilizes "Raman wires" spaced 0.5μm apart in a temporally sequenced three-phase configuration, with captured atoms located within 5μm from the chip surface. This configuration will produce fields that can couple different momentum states. Relative to previous experiments, our design will decrease spontaneous emission due to lack of laser beams, resulting in increased lifetimes. [1] Y.-J. Lin et al., Nature, 462 628 (2009)

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