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Spin current injection by intersubband transitions in quantum wells. EUGENE SHERMAN, ALI NAJMAIE, JOHN E. SIPE, Dept. of Physics, University of Toronto, 60 St. George Street, Toronto, ON M5S 1A7, Canada — We show that a pure spin current can be injected in quantum wells by absorption of linearly polarized infrared radiation leading to transitions between subbands. The magnitude and the direction of the spin current depend on the Dresselhaus and Rashba spin-orbit coupling constants and light frequency and, therefore, can be manipulated by changing the light frequency and/or applying an external bias across the quantum well. The injected spin current should be observable either as a voltage generated via extrinsic spin-Hall effect, or by spatially resolved pump-probe optical spectroscopy.

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