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Very efficient electrical spin injection into quantum dots at zero magnetic field. PIERRE RENUCCI, FABIAN CADIZ, PHILIPPE BARATE, DELPHINE LAGARDE, LPCNO-INSA-CNRS, SHIHENG LIANG, Institut Jean Lamour Nancy , BINGSHAN TAO, Institute of Physics Beijing, JULIEN FROUGIER, UMP CNRS/Thales, YUAN LU, Institut Jean Lamour Nancy, BO XU, Institute of Semiconductors Beijing, HENRI JAFFRES, UMP CNRS/Thales, ZG WANG, Institute of Semiconductors Beijing, X FHAN, Institute of Physics Beijing, MICHEL HEHN, STEPHANE MANGIN, Institut Jean Lamour Nancy, JEAN-MARIE GEORGE, UMP CNRS/Thales, THIERRY AMAND, XAVIER MARIE, BERNHARD URBASZEK, LPCNO-INSA-CNRS — We have demonstrated for the first time at zero magnetic field a very efficient electrical spin injection into p-doped InAs/GaAs quantum dots (around one hole per dot in average) thanks to an ultrathin CoFeB (a few atomic planes)/MgO spin injector, presenting perpendicular magnetic anisotropy. The circular polarization of the electroluminescence (EL) emitted by the Spin Light Emitting Diode (spinLED) follows the hysteresis cycle of the magnetic layer. At zero magnetic field, a Circular polarization as large as 22 percent is measured at low temperature, far above the values usually observed at zero magnetic field for spinLEDs. The dependence of the EL circular polarization rate on current intensity and on its duty cycle is investigated, in order to track the possible nuclear polarization of the nuclei in the dots.

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