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Electrical spin injection from Fe into $Al_xGa_{1-x}As$ quantum well spin-LEDs[1] IMRAN KHAN, MANUEL DIAZ-AVILA, MESUT YASAR, ATHOS PETROU, SUNY at Buffalo, AUBREY T. HANBICKI, GEORGE KIOSEOGLOU, BEREND T. JONKER, Naval Research Laboratory — We have studied Fe spin LEDs in which electron-hole recombination takes place either in GaAs or in $Al_xGa_{1-x}As$ quantum wells (QW). The dependence of the electroluminescence circular polarization P on temperature T in these two types of devices at fixed magnetic field is compared. The polarization in the $Al_xGa_{1-x}As$ QW LEDs decreases much more slowly with temperature compared with the GaAs QW LEDs; the polarization of the former persists up to room temperature. The improved high temperature performance of the $Al_xGa_{1-x}As$ spin LEDs is tentatively attributed to the localization of the recombining electron-hole pairs by potential fluctuations in the QW. These sites have zero-dimensional character suppressing the Dyakonov-Perel spin scattering mechanism.

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