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Spin relaxation in InGaN/Ga(Mn)N quantum wells W.M. CHEN, I.A. BUYANOVA, Linkoping Univ, K. NISHIBAYASHI, K. KAYANUMA, K. SEO, A. MURAYAMA, Y. OKA, Tohoku Univ, Japan, G. THALER, R. FRAZIER, C.R. ABERNATHY, S.J. PEARTON, JIHYUN KIM, F. REN, F.V. KYRYCHENKO, C.J. STANTON, Univ of Florida, Gainesville, FL, C. -C. PAN, G. -T. CHEN, J. -I. CHYI, National Central Univ, Taiwan, J. M. ZAVADA, US Army Research Office, NC, LINKOPING UNIV TEAM, TOHOKU UNIV, JAPAN TEAM, UNIV OF FLORIDA, GAINESVILLE, FL TEAM, NATIONAL CENTRAL UNIV, TAIWAN TEAM, US ARMY RESEARCH OFFICE, NC TEAM — Spin relaxation processes in InGaN/GaN and InGaN/GaMnN multi-quantum wells are studied by transient magneto-optical spectroscopy. Nearly no photoluminescence (PL) polarization was observed immediately after pulsed laser excitation (t=0), regardless of the polarization of the excitation light. Afterwards PL gradually becomes σ^+ polarized in an applied magnetic field. This polarization build-up is shown to correspond to an additional decay process (50 ps) of the σ^- PL component. With the aid of the exciton Hamiltonian and rate equations, we show that fast spin relaxation (<20 ps) is partly responsible for the vanishing optical polarization at t=0. The fast spin relaxation is attributed to carrier spin relaxation at high K-vectors dominated by the D'yakonov-Perel' (DP) mechanism. When the excitons are at rest (K=0), the DP spin relaxation is suppressed leading to a slower spin relaxation (50 ps).

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