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Magneto-optical THz study in multiferroic $Ni_3V_2O_8$[1] DAN HÜVONEN, U. NAGEL, T. RÕÕM, NICPB, Akadeemia tee 23, 12618 Tallinn, Estonia, N. ROGADO, DuPont Central Research and Development, Experimental Station, Wilmington, Delaware 19880, R. CAVA, Dept. of Chem. and Princeton Mat. Inst., Princeton Univ., Princeton, NJ 08544 — We present results of absorption measurements in THz region, from 3 to 220 cm^{-1}, in multiferroic $Ni_3V_2O_8$ in magnetic fields up to 12 T and temperatures above 2 K. $Ni_3V_2O_8$ is a magnetic insulator with Ni^{2+} spin-1 ions arranged in a kagomé staircase lattice. The phase diagram of $Ni_3V_2O_8$ is complicated - ground state changes from paramagnetic (PM) to high temperature incommensurate (HTI) helical state, at 9.1 K in zero field. In low temperature incommensurate (LTI) phase below 6.3 K spontaneous electric polarization **P** appears along the b axis. $\mathbf{P_b}$ can be suppressed by further cooling below 3.9 K or by application of external magnetic field. Low energy optical excitations are discussed for all low-T phases of $Ni_3V_2O_8$. Polarization sensitive absorption measurements are performed to distinguish between magnetoand electroactive spin excitations i.e. magnons and electromagnons. Different optical selection rules for magnon and electromagnon excitations enable us to search for evidence of the spin helix plane orientation and its changes at critical magnetic fields and temperatures.

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