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EPR and ENDOR of Nd^{3+} in congruent and stoichiometric $LiNbO_3$ VALENTIN GRACHEV, GALINA MALOVICHKO, MARK MUNRO, Montana State University — Since many years Lithium Niobate (LN) is of great interest for both fundamental science and applications because of the unusual richness of its ferro-, pyro- and piezoelectric properties. Conventional LN crystals, grown from a congruent melt with lithium deficiency, contain some percent of intrinsic defects. Samples grown under special conditions from melts, to which potassium has been added, have reduced contents of intrinsic defects and lower disorder (stoichiometric samples). Both congruent and stoichiometric crystals doped with neodymium were studied with the help of the electron paramagnetic resonance, EPR. Tremendous narrowing of the EPR lines in stoichiometric samples in comparison with congruent ones allowed us to distinguish four non-equivalent centers, as well as line splitting caused by hyperfine interaction of neodymium electrons with nuclear spins of magnetic isotopes ^{143}Nd and ^{145}Nd. One of the centers has axial C_3 symmetry, whereas others have lowest C_1 symmetry due to presence of intrinsic defects or/and charge compensation defects in the near neighborhood of Nd^{3+}. Narrow EPR lines allowed us also to investigate Electron Nuclear Double Resonance (ENDOR). Structures of the Nd^{3+} centers derived from the EPR/ENDOR data and effects produced by micro- and macro-imperfections of LN crystals are discussed.

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