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AC Magnetic Susceptibility and μ SR Study of Spin Dynamics and the Onset of Magnetic Correlations in $\text{LiHo}_x\text{Y}_{1-x}\text{F}_4$ ¹ R.C. JOHNSON, Boston College, B.Z. MALKIN, Kazan Federal University, A. LASCIALFARI, Univ. of Milan, A. AMATO, C. BAINES, Paul Scherrer Institute, J.S. LORD, S.R. GIBLIN, Rutherford Appleton Laboratory, B. BARBARA, Néel Institute, M.J. GRAF, Boston College — The onset of correlation effects in the magnetic Ho^{3+} -subsystem in $\text{LiHo}_x\text{Y}_{1-x}\text{F}_4$ single crystals is studied by comparing measurements and simulations of the field and frequency dependent magnetic AC susceptibility at 1.8 K and field and temperature dependent muon depolarization rates (μ SR) for the concentrations $x=0.0017, 0.0085, 0.041$ and 0.0855 . Specific features in the field and frequency dependence of in-phase and out-of-phase susceptibilities, in particular, broadening of peaks (dips) in χ' (χ'') that indicate enhanced relaxation processes at field induced avoided level crossings, can be associated with x -dependent changes of cross relaxation rates and the phonon bottleneck effect in the spin-lattice relaxation. The observed peak in the measured temperature dependent muon relaxation rate appears to be related to a maximum at the frequency 60 cm^{-1} in the acoustic phonon density of states.

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