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Muon spin rotation investigation of the pressure effect on the magnetic penetration depth in $YBa_2Cu_3O_x$[1] ALEXANDER MAISURADZE, Paul Scherrer Institute, CH-5232 Villigen PSI, Switzerland, ALEXANDER SHENGELAYA, Tbilisi State University, GE-0128 Tbilisi, Georgia, ALEX AMATO, EKATERINA POMJAKUSHINA, Paul Scherrer Institute, CH-5232 Villigen PSI, Switzerland, HUGO KELLER, Physuics Institute of University of Zurich, CH-8057 Zurich, Switzerland, UNIVERSITY OF ZURICH TEAM, PAUL SCHERRER INSTITUTE TEAM, TBILISI STATE UNIVERSITY TEAM — The pressure dependence of the magnetic penetration depth λ in polycrystalline samples of $YBa_2Cu_3O_x$ with different oxygen concentrations $x = 6.45$, 6.6, 6.8, and 6.98 was studied by muon spin rotation (μSR). The pressure dependence of the superfluid density $\rho_s \propto 1/\lambda^2$ as a function of the superconducting transition temperature T_c is found to deviate from the usual Uemura line. The ratio $(\partial T_c/\partial P)/(\partial \rho_s/\partial P)$ is factor of $\simeq 2$ smaller than that of the Uemura relation. In underdoped samples, the zero temperature superconducting gap Δ_0 and the BCS ratio $\Delta_0/k_B T_c$ both increase with increasing external hydrostatic pressure, implying an increase of the coupling strength with pressure. The relation between the pressure effect and the oxygen isotope effect on λ is also discussed. In order to analyze reliably the μSR spectra of samples with strong magnetic moments in a pressure cell, a special model was developed and applied.

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