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EVIDENCE FOR EVOLUTION IN WEAK MGII ABSORBERS AT $Z < 1.5$

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ABSTRACT

We present a survey of 92 weak MgII absorbers [those with $W_r(2796) < 0.3$ Å] in 132 HIRES and UVES quasar spectra. The spectra are 97% complete to $W_r(2796) = 0.02$ Å over the redshift range 0.15–1.45 and have a cumulative redshift path of ~ 76. We find pronounced evidence for evolution in the redshift path density, dN/dz, which monotonically decreases toward higher redshift. Assuming $dN/dz \propto (1+z)^{\gamma}$, we estimate $\gamma = -1.0 \pm 0.5$, where $0.5 < \gamma < 1.0$ would represent no evolution in the population of absorbers. Similarly, assuming $dN/dz \propto (1+z)^{2+\epsilon}\{\Omega_m(1+z)^3 + \Omega_\Lambda\}^{-1/2}$, we estimate $\epsilon = -2.0 \pm 1.0$, where $\epsilon = 0$ would represent no evolution. We also discovered eight MgII absorbing systems with $W_r(2796) < 0.02$ Å and three with $W_r(2796) < 0.01$ Å, allowing us to explore the equivalent width, column density, and Doppler b parameter distributions down to very small values of $W_r(2796)$.