4.2. Disk Masses

As shown by Andrews & Williams (2005,2007), disk masses obtained from modeling the IR and (sub)-mm SEDs of circumstellar disks are well described by a simple linear relation between (sub)-mm flux and disk mass. From the ratios of model-derived disk masses to observed mm fluxes presented by Andrews & Williams (2005) for 33 Taurus stars, Cieza et al. (2008) obtained the following relation, which we adopt to estimate the disk masses of our transition disks:

$$M_{DISK} = 1.7 \times 10^{-1}[(\frac{F_\nu(1.3mm)}{mJy}) \times (\frac{d}{140pc})^2]M_{JUP} \tag{1}$$

Based on the standard deviation in the ratios of the model-derived masses to observed mm fluxes, the above relation gives disk masses that are within a factor of $\sim$2 of model-derived values; nevertheless, larger *systematic* errors can not be ruled out (see Andrews & Williams, 2007). In particular, the models from Andrews & Williams (2005, 2007) assume an opacity as a function of frequency of the form $K_\nu \propto \nu$ and a normalization of $K_0 = 0.1$ gr/cm^2 at 1000 GHz. This opacity implicitly assumes a gas to dust mass ratio of 100. Both the opacity function and the gas to dust mass ratio are uncertain and expected to change due to disk evolution processes such as grain growth and photoevaporation. Detailed modeling and a additional observational constraints on the grain size distributions and the gas to dust ratios will be needed to derive more accurate disk masses for each individual transition disk.

Since in the (sub)mm regime disk fluxes behave as $F_\nu \propto \nu^{2\pm0.5}$ (Andrews & Williams, 2005), our targets are expected to be brighter (by a factor of $\sim$1.4) at 1.1 mm than they are at 1.3 mm. We thus modify Equation 1 accordingly to derive upper limits for the disk masses of the objects observed at 1.1 mm with the CSO. The disk masses (and 3-σ upper