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New Transition Probabilities for Neutral Gadolinium from Boltzmann Analysis of Fourier Transform Spectra[1] DAVID NITZ, CHAO OUYANG, St. Olaf College, ATOMIC SPECTROSCOPY TEAM — The recent availability of a large set of absolute transition probabilities for neutral gadolinium (Lawler et al., J. Phys. B: At. Mol. Opt. Phys. 44 (2011) 095001) makes it possible to investigate the relative populations of a large range of upper levels in radiometrically-calibrated Gd spectra. In cases where these populations follow a Boltzmann distribution, the effective temperature which characterizes the distribution provides a means of obtaining new transition probabilities for observable decay branches of nearby levels. While not as accurate as measurements based on branching fractions and lifetimes, this method can be applied to levels whose lifetimes are not known and does not require accounting for all of the decay branches. We are analyzing Fourier Transform spectra of Gd from the National Solar Observatory data archive at Kitt Peak used by Lawler et al. in their study and have identified two broadband spectra (9000 – 24000 cm^{-1}) which exhibit Boltzmann behavior for energy levels in the range 17750 – 36650 cm^{-1}. These analyses and a summary of new transition probabilities obtained from them to date will be presented.

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