

# New Critical Compilations of Atomic Transition Probabilities for Neutral and Singly Ionized Carbon, Nitrogen and Iron\*

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## Abstract

Because of the strong astrophysical interest in the above cited spectra and because of new literature data of significantly improved quality, we have undertaken new critical assessments and tabulations of the transition probabilities of important lines of these spectra. For Fe I and Fe II, we have carried out a complete re-assessment and update, and we have relied almost exclusively on the literature of the last 15 years, so that this new compilation supersedes our 1988 data volume. Our new tables are about 25% larger for Fe I and almost 50% larger for Fe II, and the estimated accuracies are now for the majority of lines in the 3 - 10% range for Fe I and in the 10 - 25% band for Fe II. Our updates for C I, C II and N I, N II address primarily the persistent lower transitions involving principal quantum numbers 2 and 3, as well as a now greatly expanded number of forbidden lines (M1, M2, and E2). For these transitions, sophisticated multiconfiguration Hartree-Fock (MCHF) calculations have been recently carried out, which have yielded data considerably improved from our 1996 NIST compilation and have also yielded many additional forbidden transitions. We plan to enter all this new material into our comprehensive NIST Atomic Spectra Database (ASD).

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