Multi-level Accelerated Lambda Iteration with PRD

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When parts of a spectral line form (i.e., have optical depth near unity) in a region of a stellar atmosphere where radiative excitation in the line dominates over collisional excitation, effects of coherent scattering have to be taken into account. In this paper we will discuss the problem coherent scattering poses for multi-level radiative transfer solutions and how this problem can be solved efficiently. Several examples will be discussed. Among them are a comparison of radiative cooling rates due to the calcium H and K lines computed with angle-dependent and angle-averaged redistribution, and complete redistribution, and a demonstration of the importance of cross-redistribution for the formation of the oxygen resonance triplet at 130 nm.