
A Simplified Analytic Treatment of Partial Redistribution in Resonance Lines

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Abstract

Ivan Hubeny contributed to the conceptual understanding of partial redistribution in strong resonance lines, elaborating on his concept of "frequency thermalization." These types of concepts can be developed into semi-analytic expressions that approximate and complement formal analytic treatments, allowing a range of tradeoffs between simplicity and accuracy in the modeling of strongly coherent resonance lines. This talk focuses on the conceptual advances made possible by "rough and ready" analytic approximations to resonance-line transfer, with an eye to better understanding the nature of such transfer as a precursor to more accurate modeling, and as a means of guiding more rapid convergence of detailed simulations. To this end, the conceptual value of second-order transfer treatments, a partially coherent version of the Eddington-Barbier relation, and the comoving-frame partially coherent scattering approximation, are unified into simple, albeit approximate, results.

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