CALCULATION OF THE TEMPERATURE STRUCTURE OF AN OPTICALLY THIN PLASMA FROM ITS EMISSION LINE SPECTRUM

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Knowledge of the (differential) emission measure function (with temperature), Y(Te), is likely to be of fundamental significance in attempts to understand the behaviour of any optically thin plasma - and this is certainly true of present studies of the solar atmosphere. In this latter case the gross temperature structure of material below 10^6K has been deduced from uv line measurements since the early 1960's and, since 1968, similar analyses of the material above 10^6K have been made using emission lines at x-ray wavelengths. In this latter case the validity, and even desirability, of published results has recently been quite strongly challenged. Comment is made upon those criticisms of early results and upon their relevance to present day analyses. In this paper the crucial value of fine temperature resolution in the determination of the emission measure function of this coronal material is argued. Assessment is made of the presently practical limits within which $Y(T_e)$ may be determined for this coronal material. The assessment uses current quality measurements as input data. The results indicate, contrary to recent assertion, that meaningful temperature analysis of coronal material, with useful significance with respect to both statistical and systematic uncertainty, is indeed possible.

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