

Iron and calcium abundances in solar flares from the multitemperature analysis of X-ray spectra

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A generalized method of calculating the distribution of the emission measure with temperature (DEM) for optically thin plasma has been developed. The method simultaneously uses line flux ratios in addition to line fluxes. When a ratio of lines from the same element is used, the resulting DEM is independent of this element's abundance. The method has been applied to derive the absolute abundances of iron in solar flares from X-ray spectra recorded by the Bent Crystal Spectrometer on SMM. The iron abundances have been found to vary between flares. The calcium abundances have also been calculated using the same method and are found to be in close agreement with the values derived from the line to continuum technique. The variation of iron and calcium abundances is compared. A correction to ionization balance for iron is proposed.