J Astrophys Aerospace Technol 2016, 4:3(Suppl)
http://dx.doi.org/10.4172/2329-6542.C1.006

Astronomical redshifts of highly ionized regions

Peter M Hansen
California State Polytechnic University, USA

Astronomical or cosmological redshifts are an observable property of extragalactic objects and have historically been wholly attributed to the recessional velocity of that object. The question of other, or intrinsic, components of the redshift has been highly controversial since it was first proposed. This paper investigates one theoretical source of intrinsic redshift that has been identified. The highly ionized regions of active galactic nuclei (AGN) and quasi-stellar objects (QSO) are, by definition, plasmas. All plasmas have electromagnetic scattering characteristics that could contribute to the observed redshift. To investigate this possibility, one region of a generalized AGN was selected, the so called broad line region (BLR). Even though unresolvable with current instrumentation, physical estimates of this region have been published for years in the astronomical literature. These data, selected and then averaged, are used to construct an overall model that is consistent with the published data to within an order of magnitude. The model is then subjected to a theoretical scattering investigation. The results suggest that intrinsic redshifts, derivable from the characteristics of the ambient plasma, may indeed contribute to the overall observed redshift of these objects.

phansen1@hotmail.com

Mg II lines observed during the X-class flare on 29 March 2014 by the interface region imaging spectrograph

W Liu, P Heinzel, L Kleint and J Kašparová
Astronomical Institute - Czech Academy of Sciences, Czech Republic

Mg II lines represent one of the strongest emissions from the chromospheric plasma during solar flares. In this article, we studied the Mg II lines observed during the X1 flare on 29 March 2014 by the interface region imaging spectrograph (IRIS). IRIS detected large intensity enhancements of the Mg II h and k lines, subordinate triplet lines, and several other metallic lines at the flare footpoints during this flare. We have used the advantage of the slit-scanning mode (rastering) of IRIS and performed, for the first time, a detailed analysis of spatial and temporal variations of the spectra. Moreover, we were also able to identify positions of strongest hard X-ray (HXR) emissions using the Reuven Ramaty high energy solar spectroscopic imager (RHESSI) observations and to correlate them with the spatial and temporal evolution of IRIS Mg II spectra. The light curves of the Mg II lines increase and peak contemporarily with the HXR emissions but decay more gradually. There are large red asymmetries in the Mg II h and k lines after the flare peak. We have seen two spatially well-separated groups of Mg II line profiles, non-reversed and reversed. In some cases, the Mg II footpoints with reversed profiles are correlated with HXR sources. We have showed the spatial and temporal behavior of several other line parameters (line metrics) and briefly discuss them. Finally, we have synthesized the Mg II k line using our non-LTE code with the multilevel accelerated lambda iteration (MALI) technique. Two kinds of models are considered, the flare model F2 of Machado et al., and the models of Ricchiazzi and Canfield. Model F2 reproduces the peak intensity of the non-reversed Mg II k profile at flare maximum, but does not account for high wing intensities. On the other hand, the RC model shows the sensitivity of Mg II line intensities to various electron-beam parameters. Our simulations also showed that the micro-turbulence produces a broader line core, while the intense line wings are caused by an enhanced line source function.

wenjuan.liu@asu.cas.cz