An Ultraviolet Spectral Atlas of the Sun 1190 – 1730 Å

P. Brekke

Institute of Theoretical Astrophysics, University of Oslo, Blindern, N-0315 Oslo, Norway

Abstract. An ultraviolet spectral atlas of different solar regions in the wavelength region 1190 – 1730 Å is presented. The data were obtained with the High Resolution Telescope and Spectrograph (HRTS) during a rocket flight in 1978. The spectral resolution of the instrument was 0.05 Å. The atlas contains spectra of three different quiet regions including disk center and the extreme limb. Data from an active region close to the solar limb and a prominence has also been included together with an atlas of a so-called explosive event. The atlas is available in a machine readable form accessible over the computer network.

1. Introduction

We present an ultraviolet spectral atlas of different solar features obtained with the NRL High Resolution Telescope and Spectrograph (HRTS) during a rocket flight in 1978. The HRTS atlas is unique since it combines better spectral and spatial resolution and coverage than any previous observations in the same wavelength region. The HRTS data have been carefully calibrated and the final results have been made available from an anonymous FTP account as well as from the MOSAIC hypertext help system.

2. Observations and Calibration

The High Resolution Telescope and Spectrograph — HRTS — is described by Bartoe and Brueckner (1975). During the second HRTS flight on 1978 February 13 the slit was oriented radially from approximately solar disk center through the active region McMath 15139, including a sunspot, and extended across the NW solar limb. The slit also crossed active region McMath 15135 close to the limb and a prominence outside the limb.

Microphotometry, data reduction and the calibration of the spectrograms has been carried out at the Institute of Theoretical Astrophysics in Oslo (Brekke 1993a). The accuracy of the wavelength calibration is better than 0.01 Å (2 km s⁻¹) over the entire HRTS wavelength range, 1190 – 1730 Å. The absolute intensity calibration was obtained by comparing relative intensity scans of a quiet solar region with absolute intensities from the Skylab S082B calibration.

---

1 Visiting Scientist: NASA Goddard Space Flight Center, Greenbelt, MD 20771

© Astronomical Society of the Pacific • Provided by the NASA Astrophysics Data System
Figure 1. The HRTS Mosaic home page
rocket, CALROC (Kjeldseth-Moe et al. 1976). In addition we have compared the measured intensities with full disk irradiance measurements obtained with the Solar Ultraviolet Irradiance Monitor (SUSIM) and the Solar-Stellar Irradiance Comparison Experiment (SOLSTICE) (see Brekke 1993a). The irradiance measurements were found to be approximately a factor 1.35 – 1.5 higher than the HRTS data (Brekke & Kjeldseth-Moe 1994). This large discrepancy points to a systematic error in the HRTS calibration as well as in most other previous UV observation.

3. Solar Features in the Atlas

The atlas contains spectra from 11 spatial positions along the slit and includes the following features: 3 quiet regions including disk center and limb spectra, 3 sunspot regions including the spectra of a light bridge, 2 plage spectra, the spectrum of a prominence, and a so-called explosive event. Details of the individual spectra can be found in Brekke et al. (1991) and Brekke (1993b) where also images of the slit-jaws are shown where the selected areas used for deriving the atlas are marked.

4. Access to the Atlas

The atlas is available in a machine readable form. Both VMS and UTRIX versions are accessible from our local computers. Together with the digital atlas we also offer a reduction program to do interactive measurements. The program is written in IDL – Interactive Data Language. In addition to this IDL program, a short Fortran code is available to read the atlas.

The atlas, including the reduction program, can be obtained from an anonymous FTP account at the Institute of Theoretical Astrophysics, University of Oslo, by contacting the author on E-mail address: paalb@astro.uio.no. The easiest way of obtaining information about how to access the data, display spectra and look at examples from the atlas is to use the MOSAIC hypertext help system. The HRTS Mosaic home page is shown in Figure 1 and its address is http://umbra.gsfc.nasa.gov/uv_atlas/atlas.html

References

Brekke, P. 1993a, Ph.D. Thesis, University of Oslo