

WWW Resources for Ay 123

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started Sep. 2004, updated Sep. 2011

Pretty Pictures

Lots of pretty pictures:

www.stsci.edu (see pictures)

see also <http://www.stsci.edu/astroweb/cat-pictures.html>

Astronomy picture of the day, <http://apod.nasa.gov>

Major International Stellar Observational Database:

Centre de Donnees Astronomique de Strasbourg (France)

<http://cdsweb.u-strasbg.fr/CDS.html>

(includes infrared photometry from 2MASS,

<http://www.ipac.caltech.edu>, optical photometry, radial velocities, proper motions....)

Bibliographical Services

Los Alamos Preprint Server (now at Cornell)

<http://xxx.arxiv.org/>

Astronomical Data Center (tables, catalogs)

<http://adc.gsfc.nasa.gov>

Astrophysics Data System (journal papers)

http://adsabs.harvard.edu/article_service.html

(Note that the Astrophysics Library has on-line subscriptions to the major astronomical journal. See

<http://library.caltech.edu/collections/astrophysics.htm>)

Atomic Physics Information

National Institute for Standards

<http://www.nist.gov/phys.htm>

big databases on atomic energy levels, wavelengths of lines of various elements, transition probabilities, etc.

Vienna (Austria) Atomic Database -

<http://www.astro.univie.ac.at/~vald/>

Nuclear Reaction Rates

See compilation of Hoffman, Rauscher, Heger & Woosley, <http://www-phys.llnl.gov/Research/RRSN/> or, from the NACRE collaboration, <http://pntpm.ulb.ac.be/nacre.htm>.

for AGB stars see FRUITY (Franec Repository of Upgraded Isotopic Tables & Yields), <http://www.oa-teramo.inaf.it/fruity>

Database for Isotopes

Isotopes project home page at Lawrence Berkeley Lab, <http://ie.lbl.gov>

Opacities

The Iron project home page is www.usm.uni-muenchen.de/people/iron-project.html

The OPAL Opacity Code of Lawrence Livermore National Lab, <http://opalopacity.llnl.gov>

Low temperature opacities (includes molecules) from Alexander and Ferguson, <http://webs.wichita.edu/physics/opacity>

Model atmospheres information

The standard grid of model atmospheres is that of Bob Kurucz of the Smithsonian Astrophysical Observatory, Cambridge, Mass. The name of his model atmosphere code is ATLAS. Bob Kurucz, R.L. 1979, *Astrophysical Journal Supplements*, 40, 1. Written for VMS Vax, now available in Unix version as well. These programs and model grids and flux grids are available via CD Roms and the Internet. Grid goes 5500 - 50,000 K, $\log(g)$ 0 - 5, abundances solar, 1/10 solar, 1/100 solar. LTE. Latest released version is ATLAS9 (1992).

URL to find ATLAS, Balmer and Width codes from Kurucz on line

<http://www.stsci.edu/software/CCP7/>

(This is a mirror site of a site actually in Scotland) also see Kurucz's home page (which I believe is cfaku5.harvard.edu) for information on ordering the CD Roms.

The NextGen Model Atmosphere Grid for $3000 \leq T_{eff} \leq 10,000K$ Hauschildt, PH, Allard, F and Baron, E., 1999, *Astrophysical Journal*, 512, 377 (LTE), 3000 - 10,000 K, steps of 200K, $\log g$ 3.5 to 5.5 in steps of 0.5, and metallicity of 10^{*-4} of solar to solar. Name of Code is PHOENIX. URL is

<http://dilbert.physast.uga.edu/~yeti>

They are working on an extension towards lower T_{eff} for very low mass stars and brown dwarfs. This requires improved molecular opacities and better atomic data for molecules.

Spectrum of the Sun

Available via anonymous ftp from

<ftp://nsokp.nso.edu/pub/atlas/visatl>

(from the README file for the visatl atlas)

An Atlas of the Spectrum of the Solar Photosphere
from 13,500 to 28,000 cm⁻¹ (3570 to 7405Å)

L. Wallace, K. Hinkle, and W. Livingston,
National Optical Astronomy Observatories.

The files collected here were made in conjunction with, and are intended to be used with, the hard copy of this atlas.

The files with the prefixes "sp" contain the spectral data from which the plots were made. Each of these contains a 50 cm⁻¹ region with a 3 cm⁻¹ overlap on each end. Following the prefix "sp" is the lead frequency

of the segment, e.g., “14150”. For the region 13,500 to 20,000 cm⁻¹, the four columns of each file contain, first the frequency, second the deduced telluric spectrum, third the observed photospheric spectrum before correction for telluric absorption, and fourth the photospheric spectrum corrected for telluric absorption. The region 20,000 to 28,000 cm⁻¹ contains no sensible narrow-line telluric absorbers and consequently the files contain only the frequencies and the observed spectrum. The required multiplicative factors to correct the observed frequencies to the laboratory scale are 1.0000013 for 13,500 to 16,000 cm⁻¹, 0.9999981 for 16,000 to 20,000 cm⁻¹, and 1.0000018 for 20,000 to 28,000 cm⁻¹.

The remaining files are encapsulated post-script files, one per atlas page. The prefix “ph” indicates the corrected photospheric spectra in Section II of the atlas. The “tr” files are the Section III pages giving atmospheric transmission and the observed photospheric spectra. Finally, “cph” and “ctr” are the compressed photospheric and transmission plots of Section I.

Our Sun

Solar granulation

<http://csep10.phys.utk.edu/astr162/lect/sun/granulation.html>

Solar movies and observations (Big Bear Solar Observatory) <http://www.bbso.njit.edu>

Stellar interior models

Bergbusch and Vandenberg (1992) ApJS, 81, 163
can be found in the Astronomical Data Center

<http://adc.gsfc.nasa.gov/adc-cgi/cat.pl?catalogs/6/6055/>

The new Yale-Yonsei grid of models can be found at
<http://achee.srl.caltech.edu>

Teramo (Italy) BASTI (A Bag of Stellar Tracks and Isochrones) <http://193.204.1.62/index.html>

Horizontal branch models can be found at www.mporzio.astro.it/~marco/sintetici/

Visualization of non-Radial Stellar Pulsation Modes

web polytrope calculator, http://nucleo.ces.clemson.edu/home/online_tools/polytrope/0.8/

a display of non-radial modes, <http://whitedwarf.org/education/vis>

See also www.kettering.edu/~drussell/demos.html (shows acoustic waves, modes etc.)

review of asteroseismology, Steven Kawaler, “Learning Physics from the Stars: Its All in the Coefficients”, <http://1109.3497> (2011)

Stellar spectra

Characteristics of the stellar spectral types, see <http://www.astronomy.ohio-state.edu/~pogge/Ast162/Unit1/SpTypes/index.html>

The ELODIE spectral library, spectra of 1388 stars obtained with the ELODIE spectrograph at the Observatoire de Haute-Provence 193cm telescope in the wavelength range 400 to 680 nm. http://www.obs-ubordeaux1.fr/public/astro/CSO/elodie_library.html