

Big Data Era in Astronomical Educational Activities in Armenia

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Byurakan Astrophysical Observatory (BAO)

IAU South West and Central Asian Regional Office of Astronomy for Development

Armenian Virtual Observatory (ArVO)

Byurakan International Summer Schools (BISS)

*COST BigSkyEarth Conference “Education in Big Data Era”
24-25 October 2016p., Sorrento, Italy*

Overview

Astronomy in schools

Extracurricular activities

Online Astronomy

Astronomy at universities

Local and International Summer Schools

DFBS as a tool for Astronomy/Astroinformatics education

Other educational tools

Astronomy in Schools

Till 2008-2009 **astronomy in Armenian schools** was taught only at the 10th (graduation) form and only 1 hour weekly. In 2009-2010, Astronomy was subtracted from the school program as a separate subject. In the new (12-year education) program for the moment it is included as a part of physics in the 9th form with 17^h course.

Special schools (e.g. Al. Shahinyan phys-math school attached to YSU, “Quantum” college, Anania Shirakatsi school, etc): beside the astronomical teaching, special ex-classroom astronomical groups are organized, where the children get deeper knowledge. Also solving theoretical and practical problems, as well as observations at BAO are being carried out.

Observational programs Stellarium, Star Calc, Cybersky, SkyMap Pro, etc. Programs by students (e. g., software related to Messier objects was written).

DVD Astronomy for Schools

Extracurricular Activities

- **Astronomy clubs** in specialized schools
- **ArAS School Lectures**
- **National Olympiads**
- **International Olympiads**
 - IAO, since 1996; 9 gold, 5 silver, 19 bronze
 - IOAA, since 2014
- **BAO Science Camps** (Lectures on Astronomy and Computers, digital technique, virtual observatories)
- **GTTP** – Galileo Teacher Training Program

Online Astronomy

“Astghagitak” (“Space Expert”) Online Popular Journal

ԱՍՏՂԱԳԻՏԱԿ

Հայկական աստղագիտական ընկերության
անցանց աստղագիտական ամսագիր

Աստղագիտության պատմություն

Աստղագիտական գործիքներ և աստղադիտարաններ

Աստղագիտությունը Հայաստանում

Հայ աստղագետներ

Արեգակնային համակարգ

Արտարեգակնային մոլորակներ և աստղակենսաբանություն

Աստղեր և միգամածություններ

Գալակտիկաներ

Տիեզերաբանություն և տիեզերածնություն

Բազմալիքային աստղագիտություն

Astronomy at universities

Courses:

- General Astronomy/Astrophysics
- Observing Technique and Methods
- Theory of Errors
- Physics of the Stars
- Interstellar Medium
- Extragalactic Astronomy
- HEA / MW Astronomy
- Theoretical Astrophysics
- Cosmology
- Databases, Archives and Vos

DVD Astronomy for Students



Local and International Summer Schools

Byurakan Summer Schools for YSU students (BSS)

2005 First Byurakan Summer School for YSU PhysDep students

2009 Second Byurakan Summer School for YSU PhysDep students

2013 Third Byurakan Summer School for YSU PhysDep students
and IAU S304 training

Byurakan International Summer Schools (BISS) / ISYA-2010

2006 First Byurakan International Summer School (1BISS)

2008 Second Byurakan International Summer School (2BISS)

2010 Third Byurakan International Summer School (3BISS) / **ISYA**

2012 Fourth Byurakan International Summer School (4BISS)

2016 Fifth Byurakan International Summer School (5BISS)




ARMENIAN VIRTUAL OBSERVATORY

Հայկական Վիրտուալ Աստղադիտարան

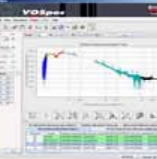
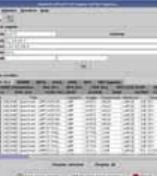

- Home
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- ArVO research group
- DFBS
- Funded Projects
- VO Standards
- VO Tools
- Publications
- ArAS
- Byurakan Observatory
- Links
- ArVO Tools & Services

Last updated: October 11, 2015.


Data Discovery

	<p>Aladin is an interactive software sky atlas allowing the user to visualize digitized images of any part of the sky, to superimpose entries from astronomical catalogs or personal user data files, and to interactively access related data and information from the SIMBAD, NED, VizieR, or other archives for all known objects in the field. Aladin is particularly useful for multi-spectral cross-identifications of astronomical sources, observation preparation and quality control of new data sets (by comparison with standard catalogues covering the same region of sky).</p>	Download
DataScope	<p>Use DataScope to find everything that's known about a given target or region of the sky. DataScope will query hundreds of VO-enabled data resources and organize the results for your viewing.</p>	Download

Spectral Analysis

	<p>VOSpec is the answer from the ESAVO Team to the demand of having a solid tool able to handle Spectra in the VO context as well as providing analysis capabilities and easy integration of spectra coming from different data providers, wavelengths, and different metadata (e.g. units).</p>	Download
	<p>SPLAT is a spectral analysis tool from the Starlink project, which is now maintained by Peter Draper at Durham University. With the assistance of Mark Taylor from the AstroGrid team, this now been "VO-enabled". It understands SAMP messages, can access VOSpace, and can make queries to worldwide spectral services.</p>	Download
	<p>Specview is a tool for 1-D spectral visualization and analysis of astronomical spectrograms. It is written in Java thus can be run anywhere Java is supported. Specview is capable of reading all the Hubble Space Telescope spectral data formats, as well as data from several other instruments (such as IUE, FUSE, ISO, FORS and SDSS), preview spectra from MAST, and data from generic FITS and ASCII tables. It can also read data from Virtual Observatory servers, and read and write spectrogram data in Virtual Observatory SED format. It can also read files in the SPC Galactic format used in the chemistry field.</p>	Download

Data visualisation and handling

	<p>VOPlot is a tool for visualizing astronomical data. VOPlot is developed in JAVA, and acts on data available in the VOTable format. VOPlot is available as a stand alone version, which is to be installed on the user's machine, or as a web-based version fully integrated with the VizieR database.</p>	Download
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Webmaster: Gor Mikayelyan

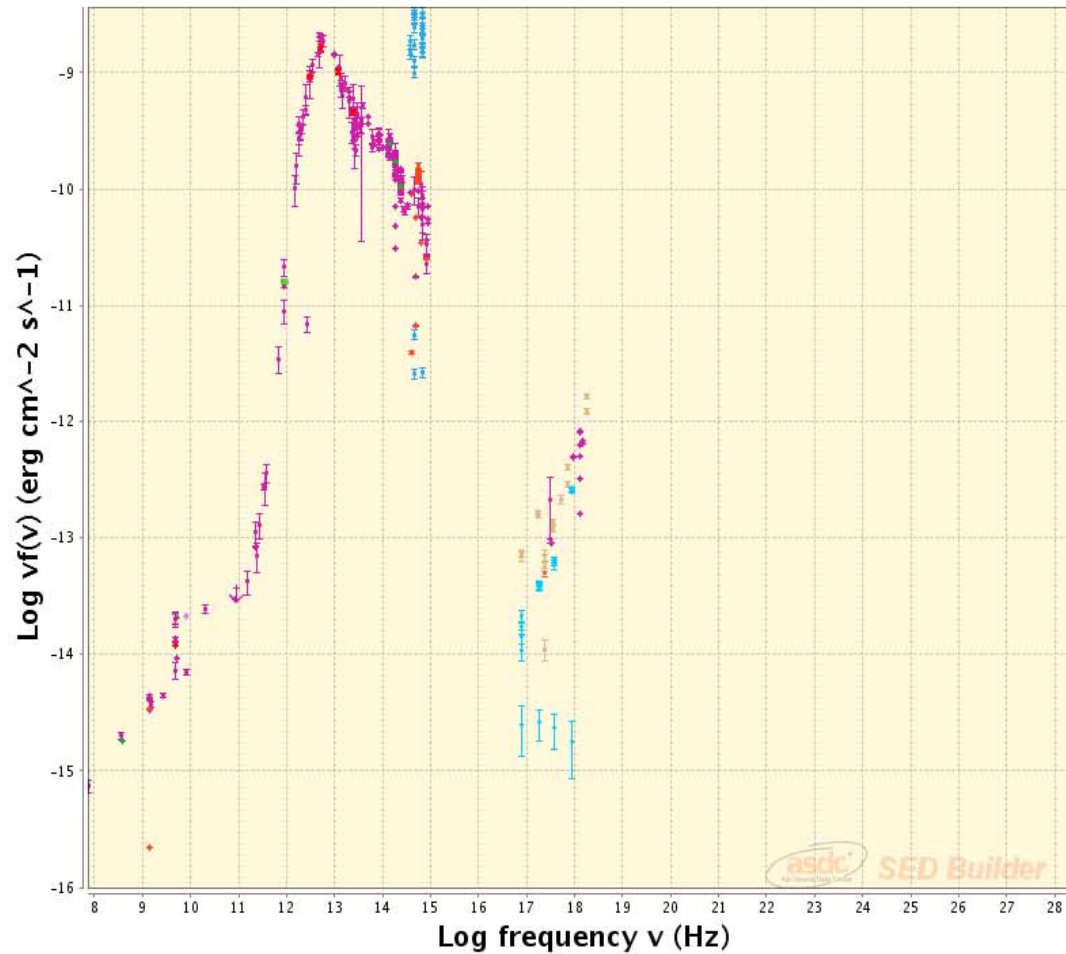


time SED tool V2.0



Version 2.1
[Login](#) [Feedback](#)
[Tutorial](#) [DATA EXPLORER](#)
[User Data](#) [Existing SEDs](#)
 Current SED Search and build new SEDs

Mrk 231 Ra=194.05931 deg Dec=56.87368 deg (NH=9.6E19 cm⁻²)



Redshift: Frame:
 X Axis: Y Axis:

+ Time Filtering

ASDC Catalogs

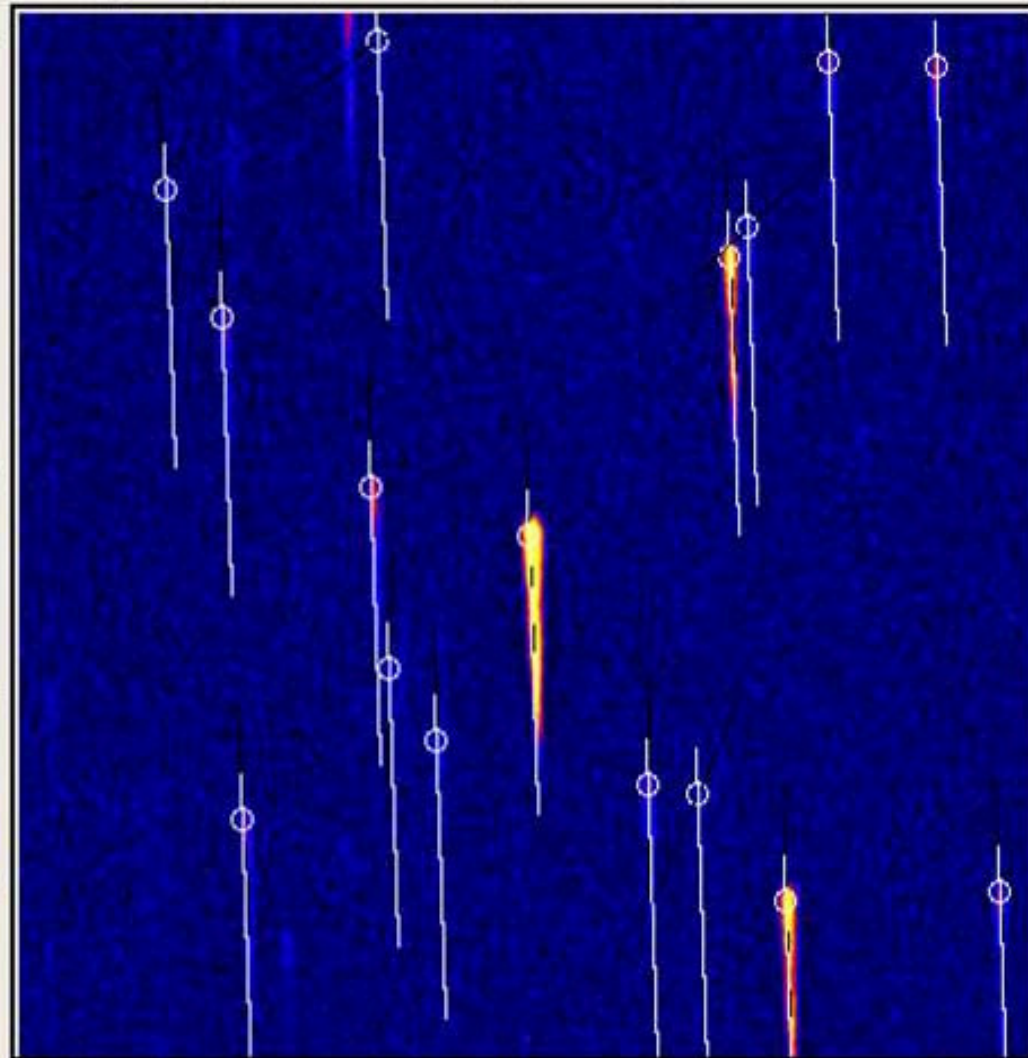
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<input checked="" type="checkbox"/>	Hard X Ray
<input checked="" type="checkbox"/>	Gamma Ray

External Catalogs

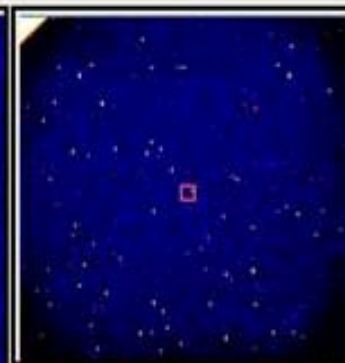
<input checked="" type="checkbox"/>	Name	Search	Options
<input checked="" type="checkbox"/>	2Mass	<input type="checkbox"/>	V U
<input checked="" type="checkbox"/>	USNO B1	<input type="checkbox"/>	V U
<input checked="" type="checkbox"/>	Catalina SS	<input type="checkbox"/>	V U
<input checked="" type="checkbox"/>	Ned	<input checked="" type="checkbox"/> Mrk 231	V U
<input checked="" type="checkbox"/>	SDSS7	<input type="checkbox"/>	V U
<input checked="" type="checkbox"/>	USNO A2.0	<input type="checkbox"/>	V U

Main

Image | data | Setup | log | Help | local data



Fits File: /fbs/images/fbs0005_cor.fits
 file dati: /fbs/usn2/fbs0005_cor.coo
 Density



Show

- Object positions
- Alignments
- Spectrum line

X: 4964 ra:14:21:13.702

Y: 5397 dec:+43:10:53.346

V: 11198

1275-08424526



Xlog

Ylog

ang: 92.30



EII. .69

B: 12.24

B-usn12.2

R: 11.91

R-usn11.4

Flag: OK

s/n: 130.7

L: 120

Save

List save

bck= 11057.8/1.44

1275-08424526

- name
- coords

Find>

Auto Manual | Mag | Finding

Manual operations

Load Fits

Compute angle


Get Spectra

First Byurakan Survey Database - Mozilla

File Edit View Go Bookmarks Tools Window Help

http://byurakan.phys.uniroma1.it/explore2.php?ra_in=21%3A32%3A03&dec_in=-12%3A47%3A42

Home Bookmarks

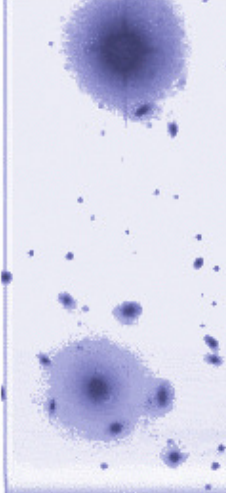
 **DFBS** archive
Digitized First Byurakan Survey

EXPLORE GET SPECTRA CREDITS
GET IMAGE TEAM

Image found in plate fbs1053
centered at (21:31:43.208, -12:45:22.17)

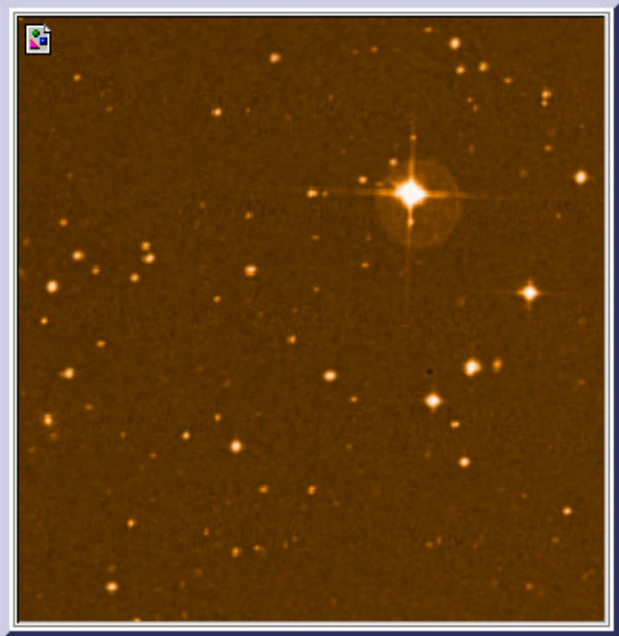
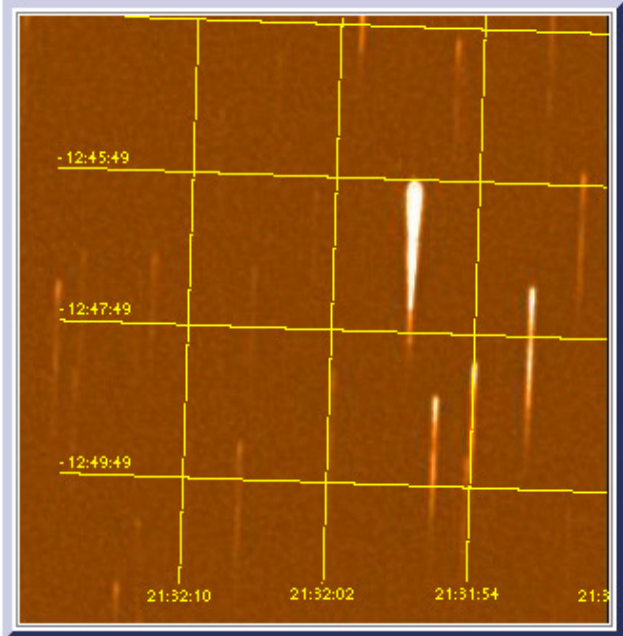
center
Ra 21:32:03
Dec -12:47:42
get Image


Options
 Grid
 Label
 Position
Compare with:
DSS1



Byurakan field

DSS1



 *Help*

Spectra selection

Document: Done (0.092 secs)

First Byurakan Survey Database - Mozilla

File Edit View Go Bookmarks Tools Window Help

http://byurakan.phys.uniroma1.it/explore2.php?ra_in=21%3A32%3A03&dec_in=-12%3A

Home Bookmarks

DFBS archive
Digitized First Byurakan Survey

EXPLORE GET SPECTRA CREDITS
GET IMAGE TEAM

Image found in plate fbs1053
centered at (21:31:43.208, -12:45:22.17)

center
Ra 21:32:03
Dec -12:47:42
get Image

Options
 Grid
 Label
 Position
 Compare with.

id: 213217-124720
wavelength (nm)
837 486 401 316
2.8
1.8
0.8
-0.1
10 30 50 80 120
pixels

collect view collection

(J2000) ra: 21:32:17.373
(J2000) dec: -12:47:20.34
R: 14.22
B: 15.24
Class: OK
Length: 101.0

Document: Done (0.967 secs)

First Byurakan Survey Database - Mozilla

File Edit View Go Bookmarks Tools Window Help

http://byurakan.phys.uniroma1.it/getspectra.php

Home Bookmarks

DFBS archive
Digitized First Byurakan Survey

EXPLORE GET SPECTRA CREDITS
GET IMAGE TEAM

Download as

selected 31 of 31 records [Download this table](#) [log file](#)

Spectra List Table

#.	id.	ra(2000)	dec(2000)	B mag	R mag	B-R
1	213143-124622	21:31:43	-12:46:22	15.38	14.29	1.09
2	213148-124541	21:31:48	-12:45:41	14.85	14.10	0.75
3	213148-125004	21:31:48	-12:50:04	16.39	15.84	0.55
4	213150-124250	21:31:50	-12:42:50	15.16	14.17	0.99
5	213150-124437	21:31:50	-12:44:37	16.84	15.92	0.92
6	213150-124714	21:31:50	-12:47:14	13.10	12.46	0.64
7	213154-124814	21:31:54	-12:48:14	14.10	12.90	1.20
8	213154-124927	21:31:54	-12:49:27	16.02	13.96	2.06
9	213155-124419	21:31:55	-12:44:19	15.52	14.30	1.22
10	213155-124400	21:31:55	-12:44:00	15.53	14.31	1.22
11	213156-124841	21:31:56	-12:48:41	14.10	12.93	1.17
12	213157-124559	21:31:57	-12:45:59	10.42	11.04	-0.62
13	213158-124307	21:31:58	-12:43:07	16.24	16.07	0.17
14	213158-124534	21:31:58	-12:45:34	10.38	11.01	-0.63
15	213200-124549	21:32:00	-12:45:49	17.09	16.73	0.36

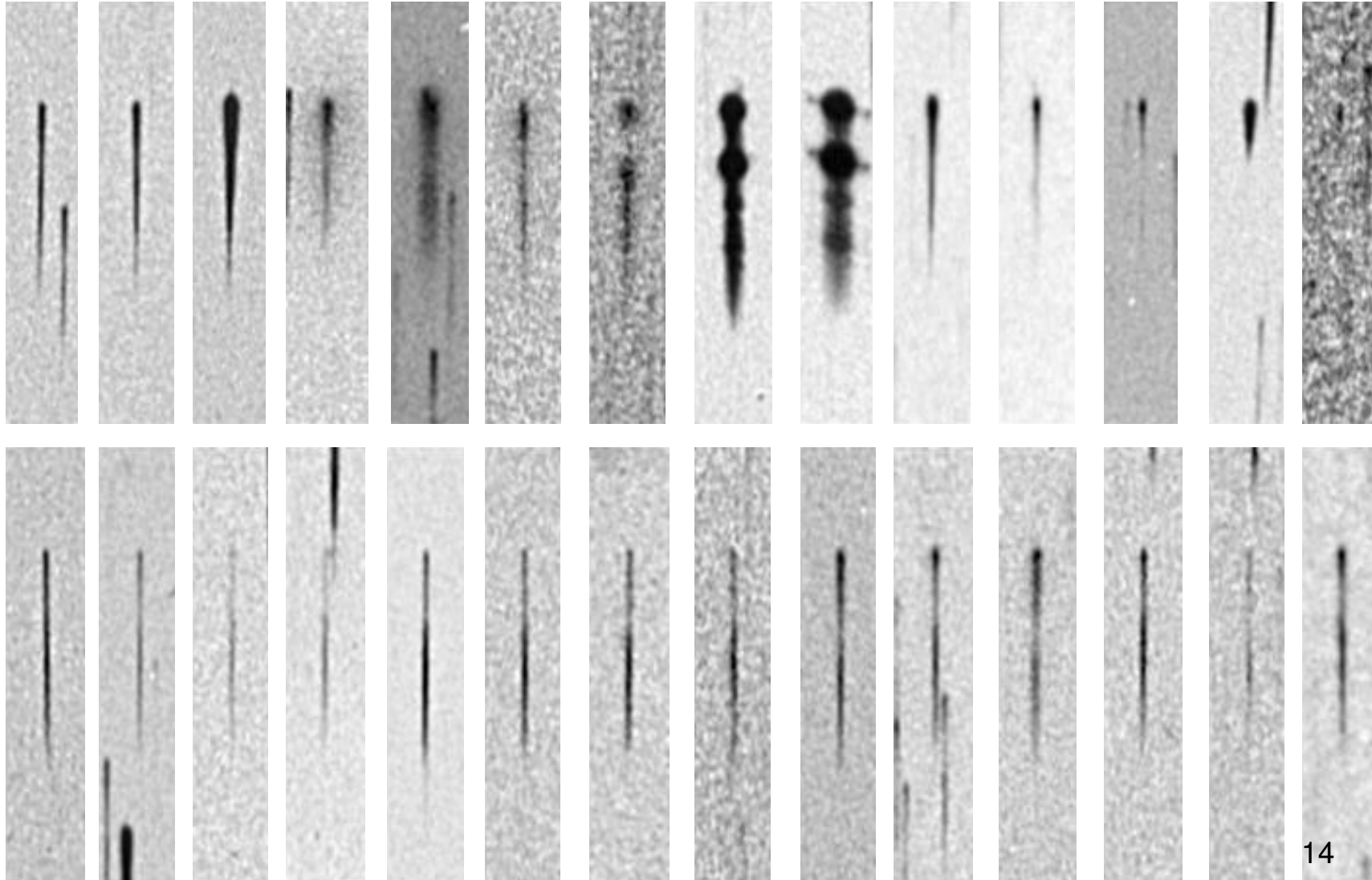
id: 213150-124250
wavelength (nm)
3.0 837 486 401 316
1.9
0.8
-0.3
10 30 50 80 120
pixels

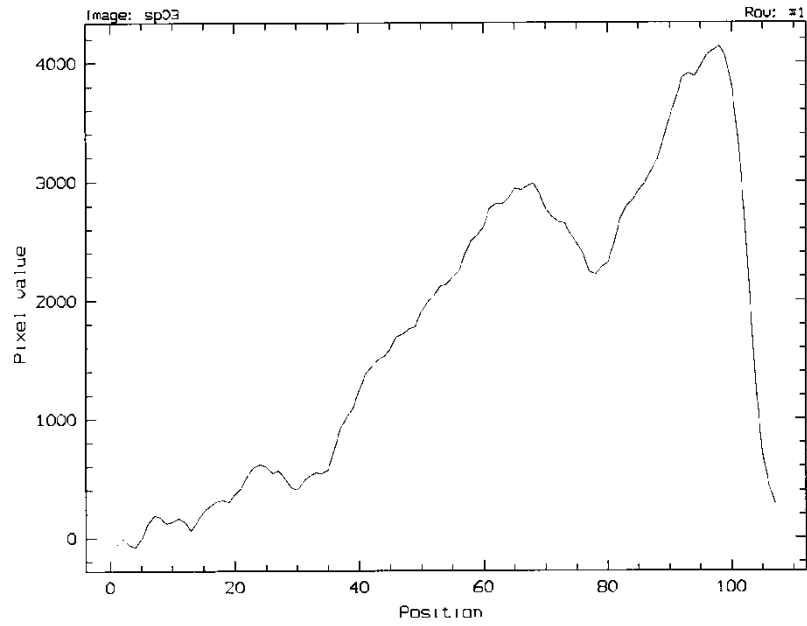
(J2000) **ra:** 21:31:50.273
(J2000) **dec:** -12:42:50.61
R: 14.17
B: 15.16
Class: U
Length: 110.0
Plate: fbs1053

collect view collection

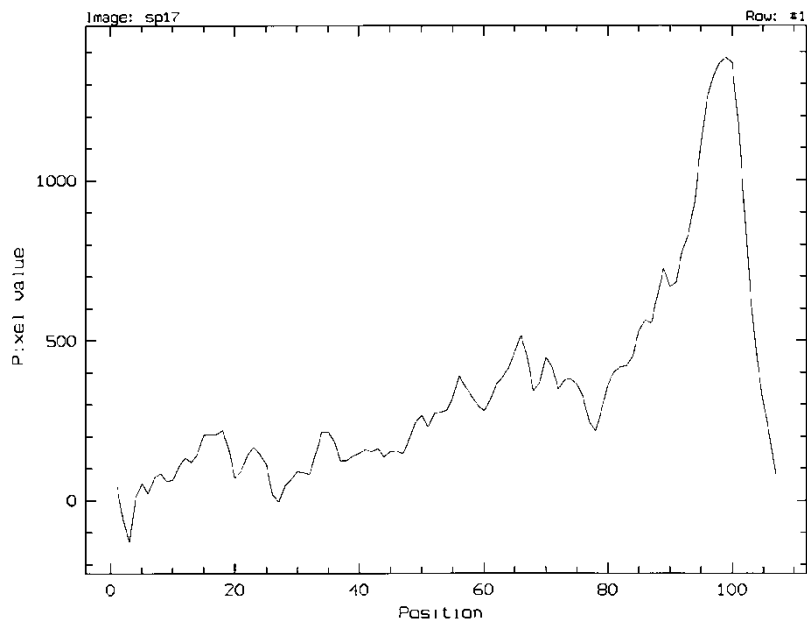
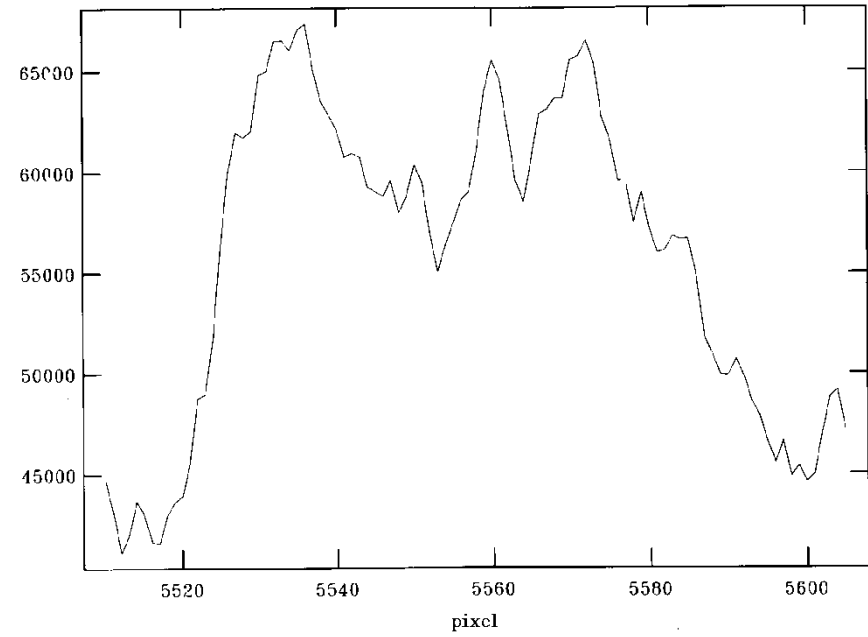
http://byurakan.phys.uniroma1.it/getSpec3.php?id=145...110ig8r4u2g3m955ftr953&angoloMedio=&tmptable=spectmp

DFBS low dispersion spectra

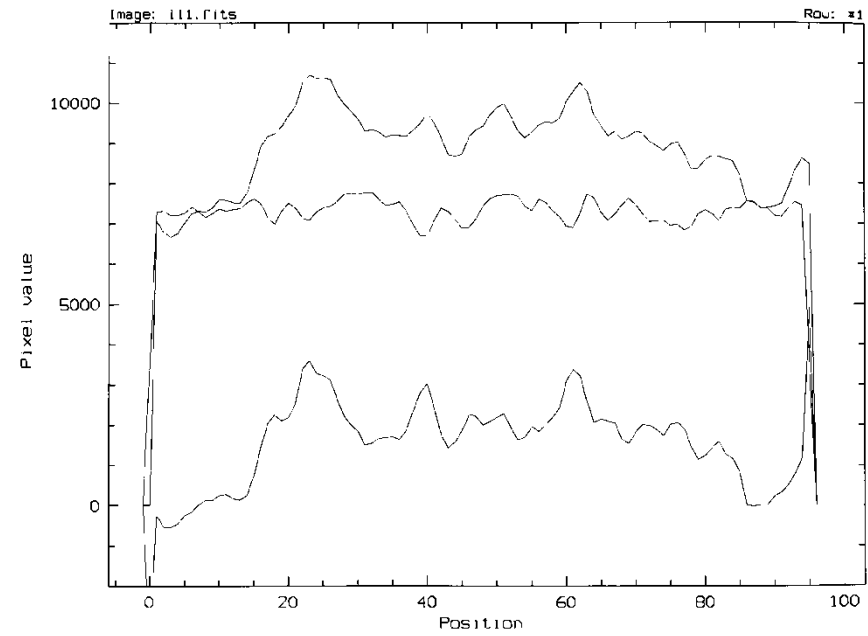




eso-nidas version: 01FEB date: Tu, 06 Aug 2002 16:02 User: aragnick



eso-nidas version: 01FEB date: Tu, 06 Aug 2002 11:06 User: aragnick



Cross-correlation page

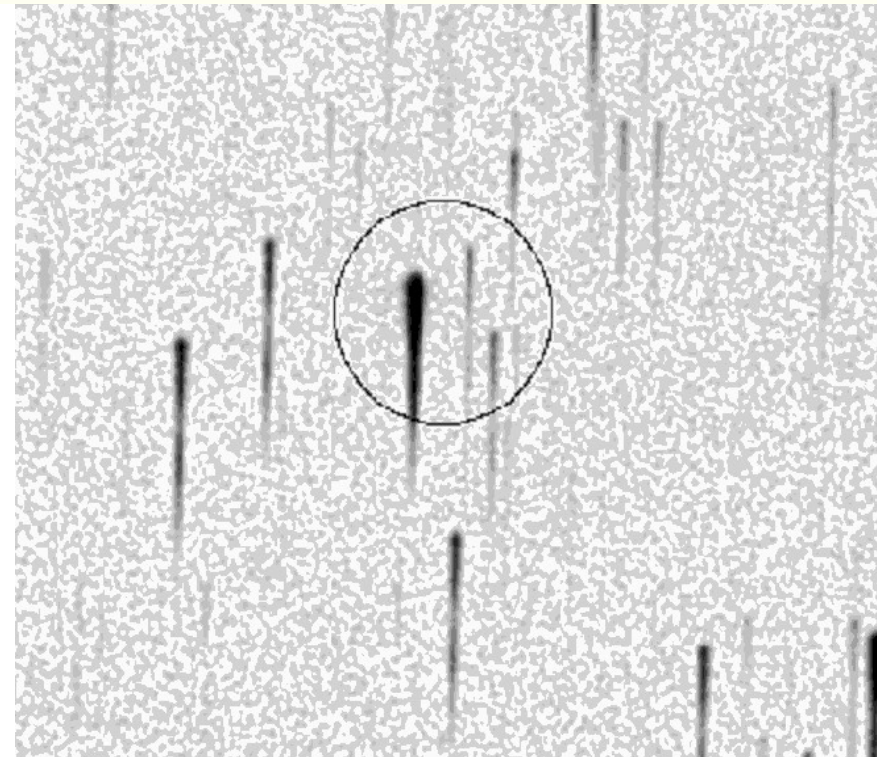
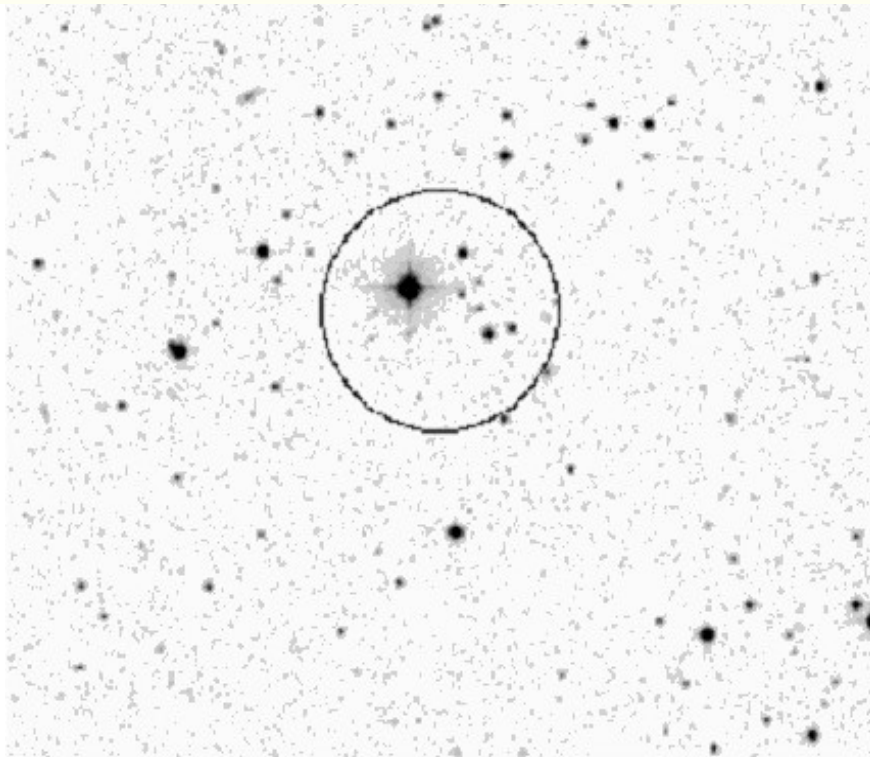
Please upload catalogs to correlate those with each other or with available on the server catalogs. You must read [requirements for uploaded catalogs](#) before starting a correlation.

Choose file No file chosen Choose file No file chosen

IRAS/PSC ▼ IRAS/FSC ▼

By RMS - 3.0 sigma By Radius (arcsec) 10.0

Submit

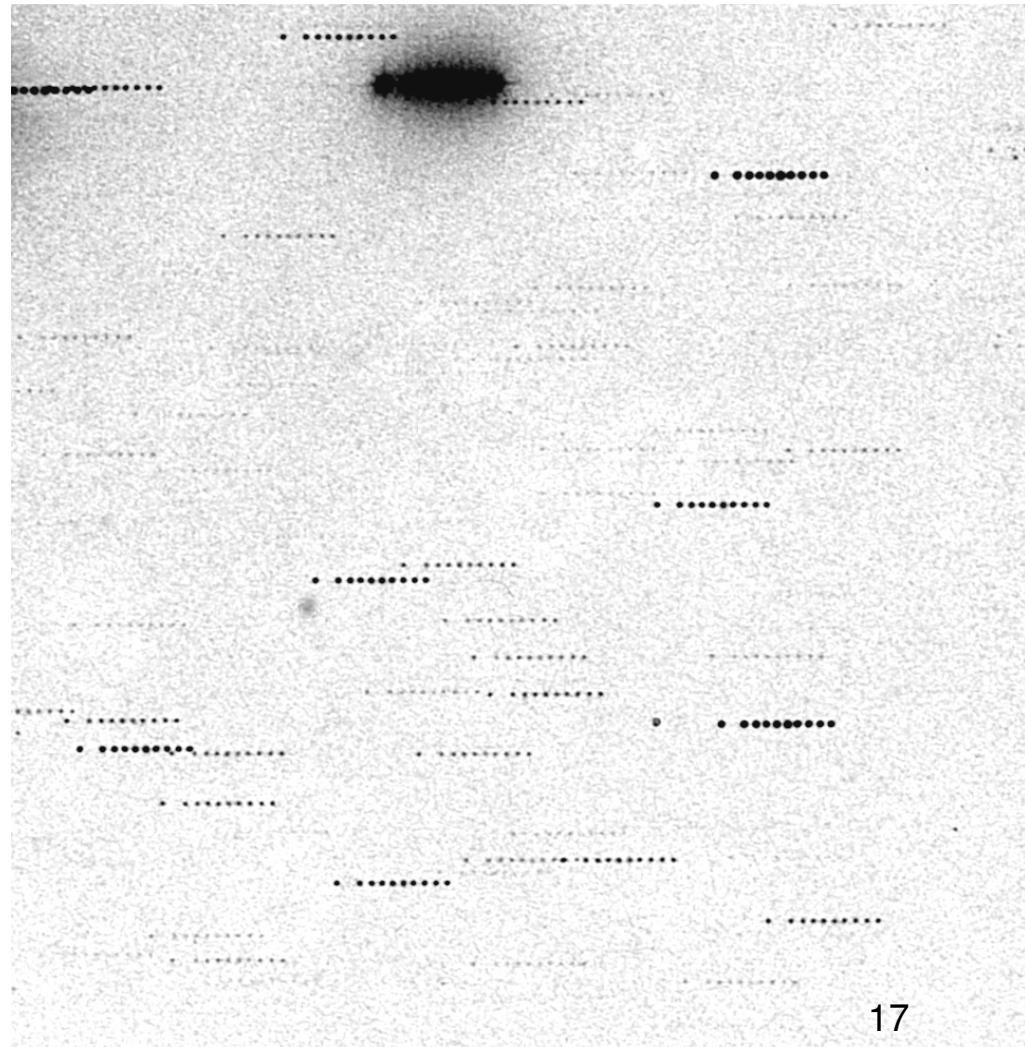
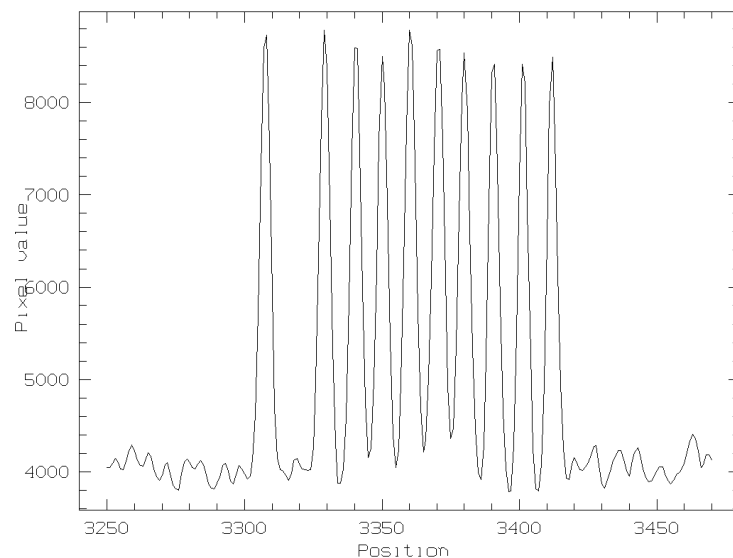


ROSAT FSC, IRAS PSC & FSC, NVSS, FIRST sources

Study of long-term variability of ON 231 and search for other variables

Photographic chains for
discovery of flare stars in stellar
clusters

Coma: 189 plates with a total
number of more than 1200
exposures in 1965-1976 with the
Byurakan 21" and 40" Schmidt
telescopes



ALADIN

Load... Save... Tools... Print... Help... Quit

Position J2000 Pixel full 4906.0

ESO DSS2-red

select, dist, draw, tag, text, filter, rgb, blink, rsamp, cont, zoom, majss, hist, prop, del

Catalogs: All, VizieR, Surveys, Missions, SIMBAD, NED, SkyBot, Others..

1" 24.29' x 23.02' 29.94' x 30.01'

ESO DSS2-red - provided by The Digitized Sky Survey from ESO (Garching)

Zoom 1/2x

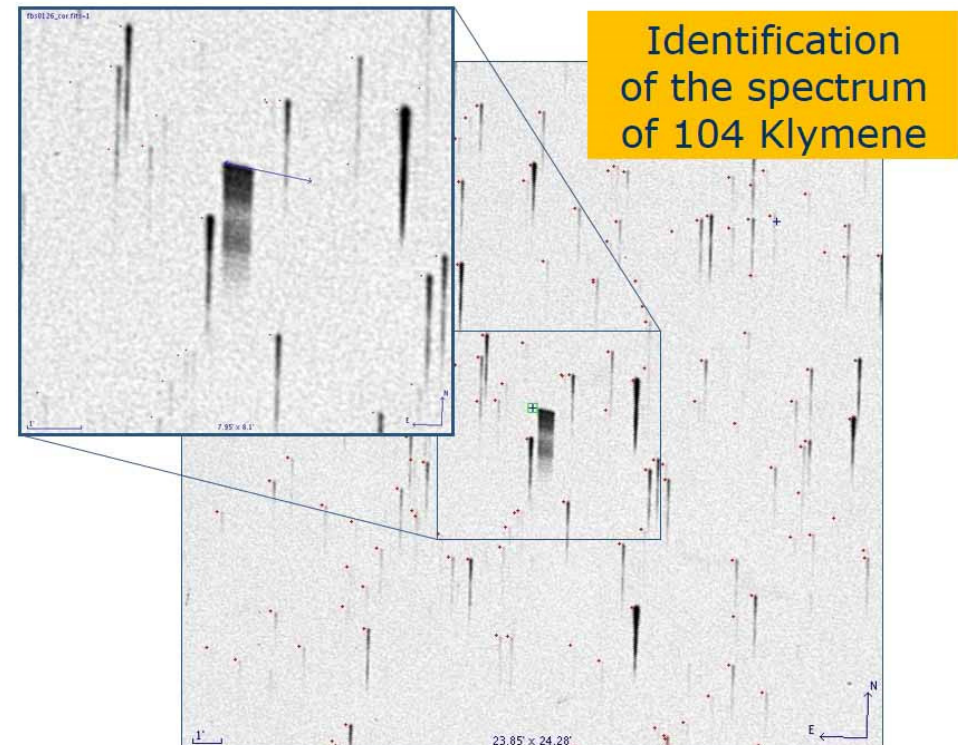
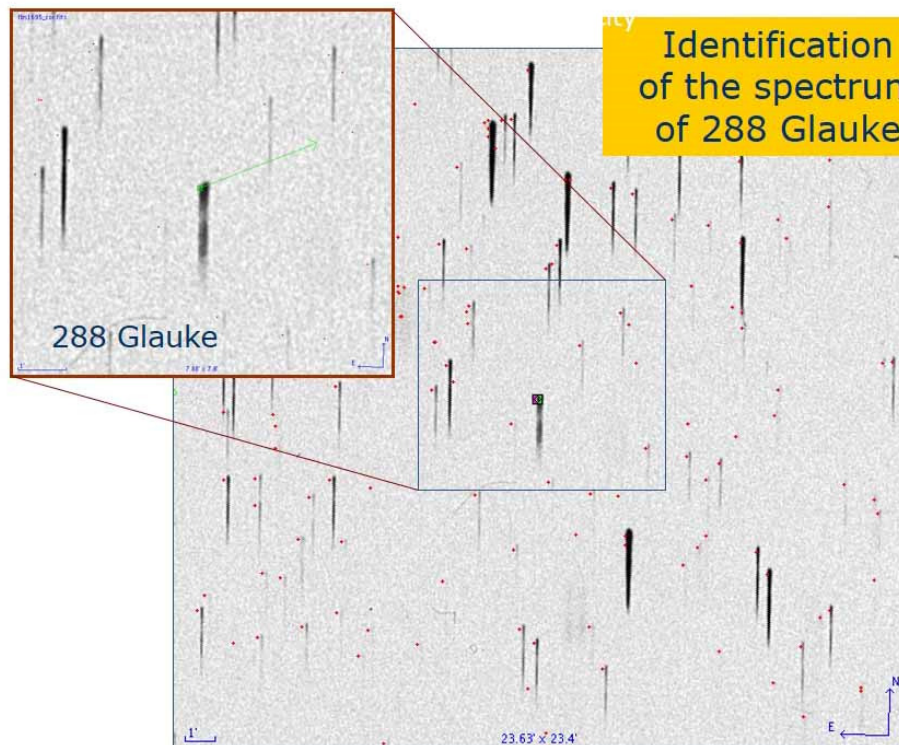
40441	Jungmann	03 22 22.2444	+12 55 12.081	MB II	18.15	3.241	18.269	-10.6767	-17.4
-	2001 WJ20	03 22 11.2982	+12 51 59.549	MB	20.27	-49.035	261.932	-12.0898	-1.2
-	2002 W28	03 22 23.3380	+12 48 30.273	MB I	19.33	-10178.050	420.180	-5.9700	5.3
12797	1995 WL4	03 22 42.4998	+13 01 00.272	MB I	18.17	-1.987	445.387	-8.2496	-7.8
-	2002 RT159	03 22 34.1425	+12 45 18.021	MB IIIb	19.87	31023.000	637.034	-11.6642	-9.4

(c)1999-2005 ULP/CNRS - Centre de Données astronomiques de Strasbourg

2 planes, 1 view, 14Mb

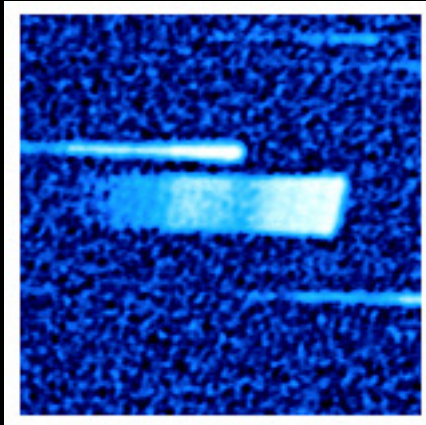
Search for Asteroids in the DFBS

- the brightest asteroids (<15-16), visible in the DFBS plates
- fast & slow asteroids (motion of 3" during exposure time 20 minutes)
- extraction of all spectra of asteroids found in DFBS by **SkyBote**; group them into extended (fast) and star-like (slow asteroids)
- modeling of a template spectra by means of the star-like spectra
- new candidate asteroids by similar spectra & comparison with DSS1/2
- spectral analysis of the asteroid spectra to get some physical parameters

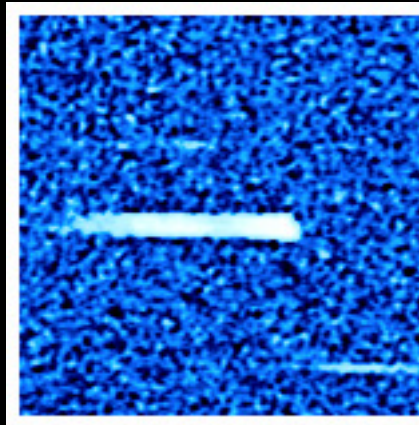


Spectra of asteroids in the DFBS

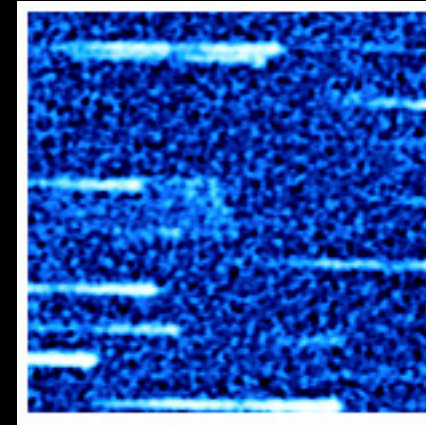
104 Klymene



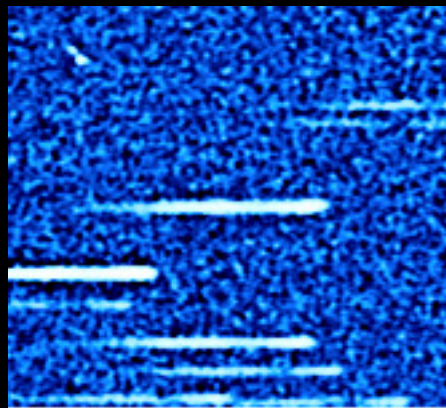
288 Glauke



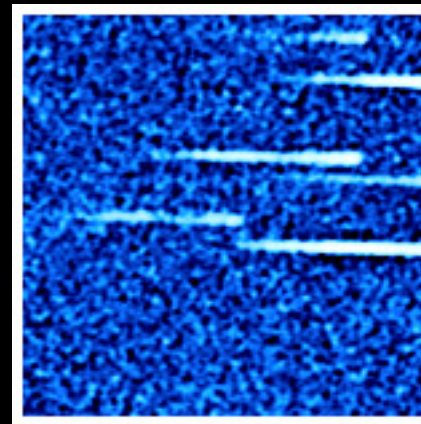
627 Charis



1323 Tugela



4713 Steel



Mrk 926 H α

