

MUNI Photometric Archive

Marek Chrastina, Miloslav Zejda, Zdeněk Mikulášek

Department of Theoretical Physics and Astrophysics, Faculty of Science, Masaryk University,
Kotlářská 2, CZ-611 37 Brno, Czech Republic, <http://astro.physics.muni.cz>

Abstract: In 90th years of the last century CCD cameras became much reachable. Due to many advantages of CCD cameras astronomers began used them as primary detector for photometry of stellar objects. Typical observatory, which operates one telescope at time, obtained 0,5 TB raw data during two decades, that means one million about 500 kB sized files. There are several observatories in Czech Republic and Slovakia (taking into account all scientific, public as well as private ones). Rough estimate of total amount of this photometric data is 10 TB, which could be very interesting source of observational data. Unfortunately, these data are not available online. These data are stored in observatory archives in arbitrary format. Often it is not even possible to find requested data. We have decided to change this state by establishing common archive of raw photometric data, which would be available online together with tools for searching, listing etc. We already defined data format, file and directory structure of our archive. We developed sophisticated tools for archive maintenance as well. Our goal is to provide data storage with simple and straightforward access and we are ready to interconnect with VO right after the IVOA Photometry Data Model will be released.

Introduction

CCD photometry has been started at Masaryk University Observatory in 1996, when the main 0.62m reflector was equipped with SBIG ST-8 camera. The most of observations are focused on variable star measurements. However, observations of comets, minor planets, extrasolar planets, star clusters and GRB afterglows was obtained, as well. All data are stored in FITS files on hard disks, CDs and DVDs. We obtained approximately 0.5 TB raw photometric data (including calibration images) during 15 years of camera operation. In other words, we have circa one million about 500 kB sized files in our archive. Unfortunately, the data are not located in any kind of database, therefore they are without any online access.

There are several observatories in Czech Republic and Slovakia (taking into account all scientific, public as well as private ones). Unfortunately, situation with their raw data is more or less the same, that means no database, no online access. These data are stored in observatory archives in arbitrary format. Often it is not even possible to find requested data.

Our rough estimate of total amount of photometric data obtained in our region is about 10 TB. Just for comparison, SDSS DR7 contains 15.7 TB of images [e1]. Each observatory has different scientific programme, but each of them works in quite a long time-base. Often they provide long-term monitoring of several objects. In addition, CCD provides measurements of whole sky field, thus we can take an advantage from field overlapping. The field can also contains objects, that may be interesting for someone else.



Fig. 1. Server and RAID-6 disk array used for MUNI Photometric Archive

MUNI Photometric Archive

It is clear that it can be very interesting source of observational data. Data are not available online from single location. That is the problem that prevents further usage of the data. For that reason we have decided to establish single common archive of raw photometric data.

Due to arbitrary format of particular data source, we have to convert data to the one specific uniform data format. We used restricted alternation of standard FITS format. We proposed explicitly defined set of keywords. Furthermore we propose strict naming convention for FITS-file names and directory structure. There are many FITS files, thus we have developed a package of useful scripts for converting FITS files into the uniform format and structure (Chrastina et al. 2010).

Our goal is to provide data storage with simple and straightforward access and we are ready to interconnect it with VO right

after the IVOA Photometry Data Model will be released. It is clear, that it is easier to interconnect one bigger homogenous archive than several smaller archives with mutually incompatible formats. At this time we collect data from various sources, we temporary store them on disk and we collect all related information about them.

First of all, MUNI Photometric Archive will provide several interesting options for scientific research. It will provide simple and quick access to raw photometric data and it will allow conditional searching through data and automated data processing, as well. Required tools are in preparation. All this effort will allow us to study phenomena such as long-term light changes and back-searching for phenomena confirmation.

Participation on this project is open. Any comments or recommendations are also welcomed.

Acknowledgement

This work has been supported by grants MUNI/A/0968/2009, GAAV IAA301630901 and MEB051018. Thanks Gabriel Szász and Filip Hroch for cooperation.

References

- Chrastina, M., Zejda, M., Mikulášek, Z. 2010, In Proceedings of "Binaries - key to comprehension of the universe" held in Masaryk University (Brno, Czech Republic) on June 8-12, 2009. ASP Conference Series, p. 83
- SDSS DR7 (The Sloan Digital Sky Survey Data Release 7), <http://www.sdss.org/dr7/>, [e1]