



ISTITUTO NAZIONALE DI ASTROFISICA



OSSERVATORIO ASTRONOMICICO DI CAPODIMONTE

Suprime-Cam Experiment: a test for the VST Surveys

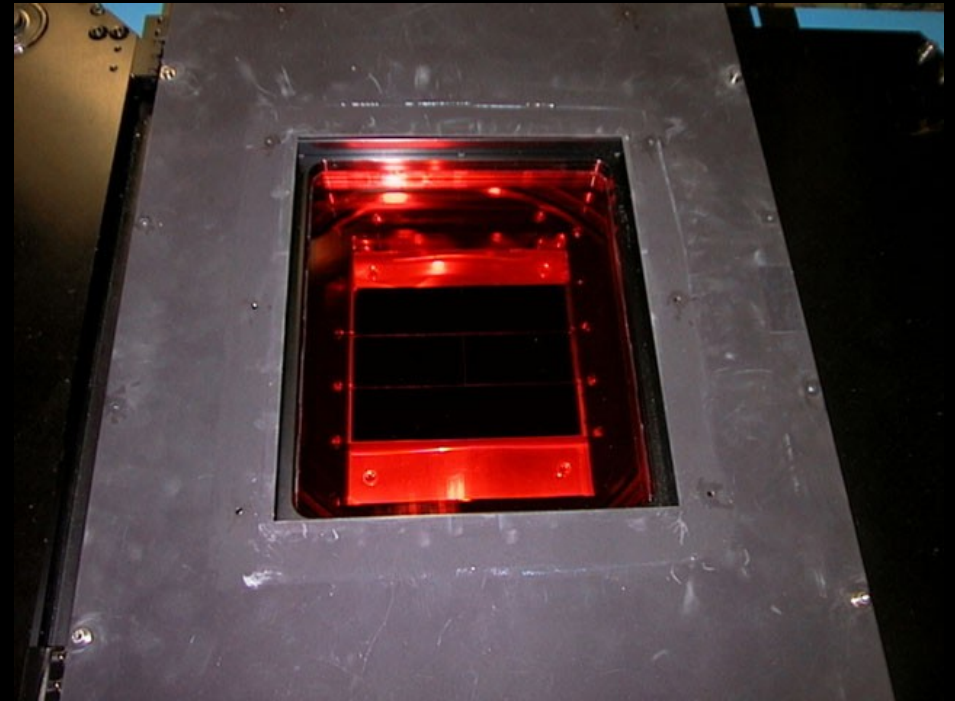
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in collaboration with
the OAC Astro-Wise team

Aim of the experiment

- We plan to test the Astro-Wise pipeline on the Galactic globular cluster NGC 2419 observed with Suprime-Cam@Subaru
- ALLFRAME (Stetson, 1994) photometry is already available
- Variable search with ISIS (Alard, 2000) has been already performed
- We therefore can check the Astro-Wise and VODIA results on a sound basis
- Lessons learned will be applied to the STEP@VST and STREGA@VST Surveys

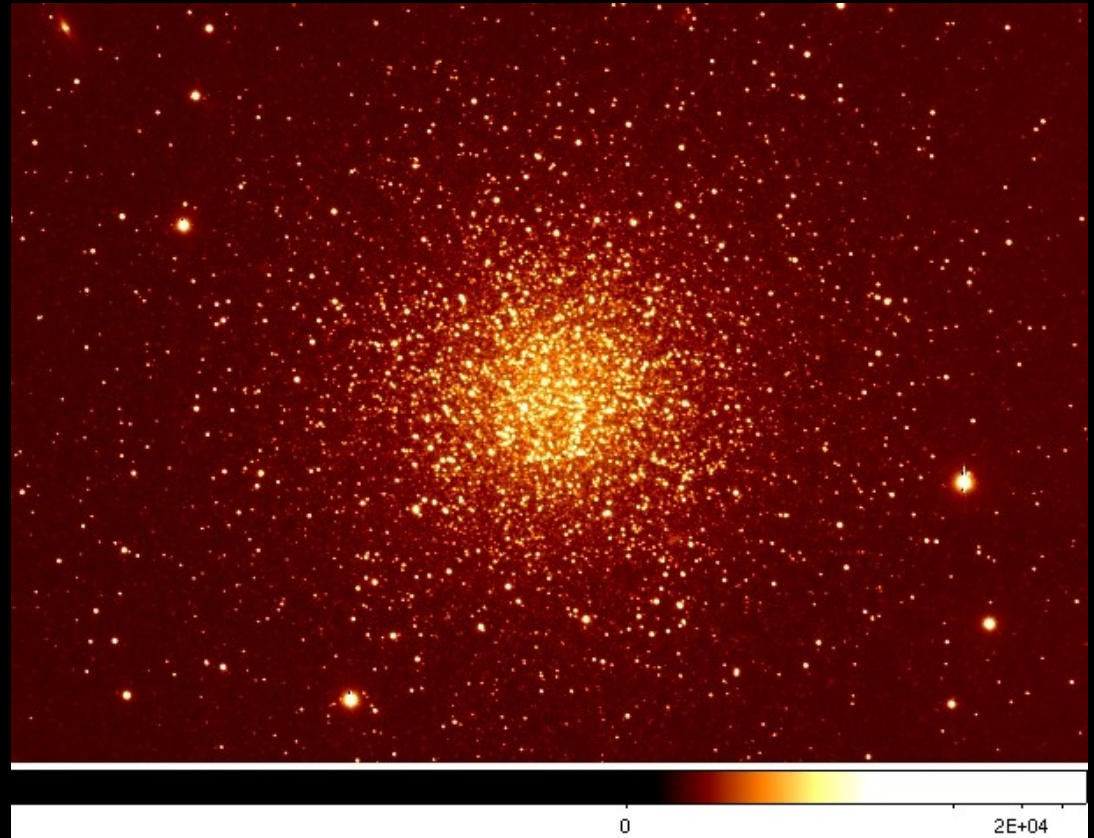
Suprime-Cam

- The Subaru is the only 8-meter class telescope that accepts prime focus instruments
- Suprime-Cam is made of 10 CCDs 2k x 4K, with more than 80 Mpx and a f.o.v. of 34 ' x 27 ' and a pixel scale of 0.20 arcsec/pixel

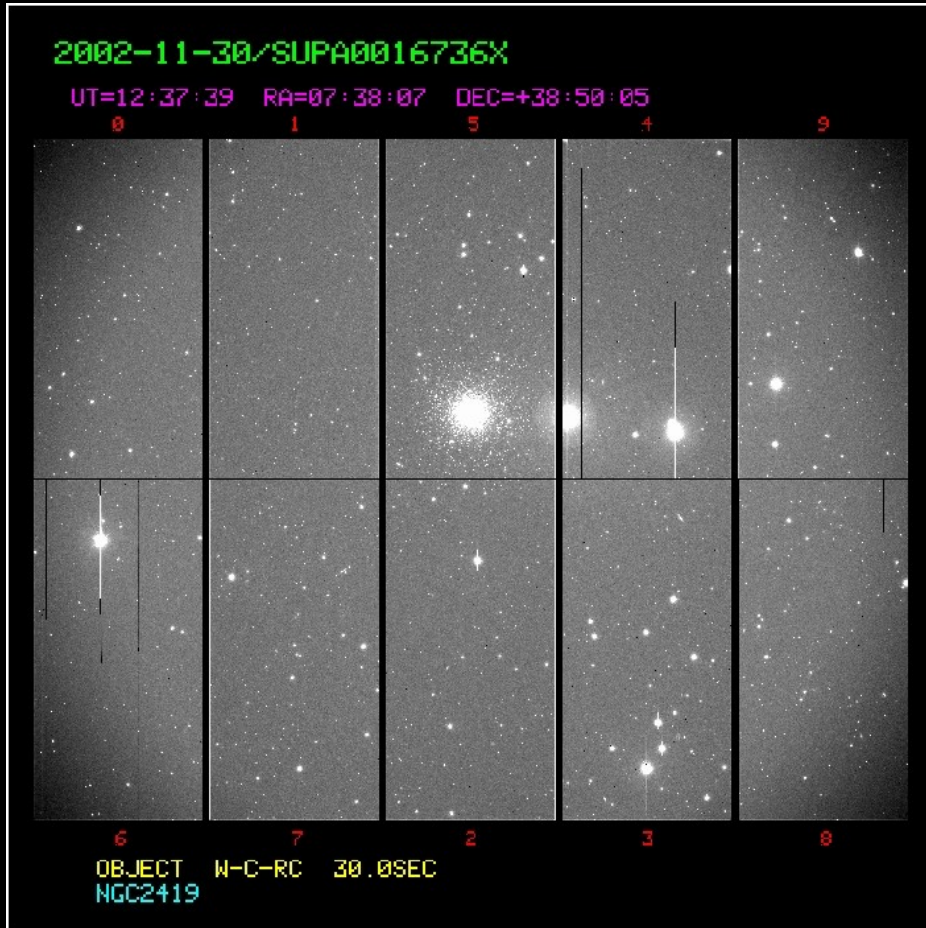


The Galactic Globular Cluster NGC 2419

- It is the fourth cluster by luminosity in the Milky Way
- It could be the nucleus of a former dwarf galaxy
- It hosts several variable stars, not fully characterized
- Possible occurrence of tidal tails



The current dataset



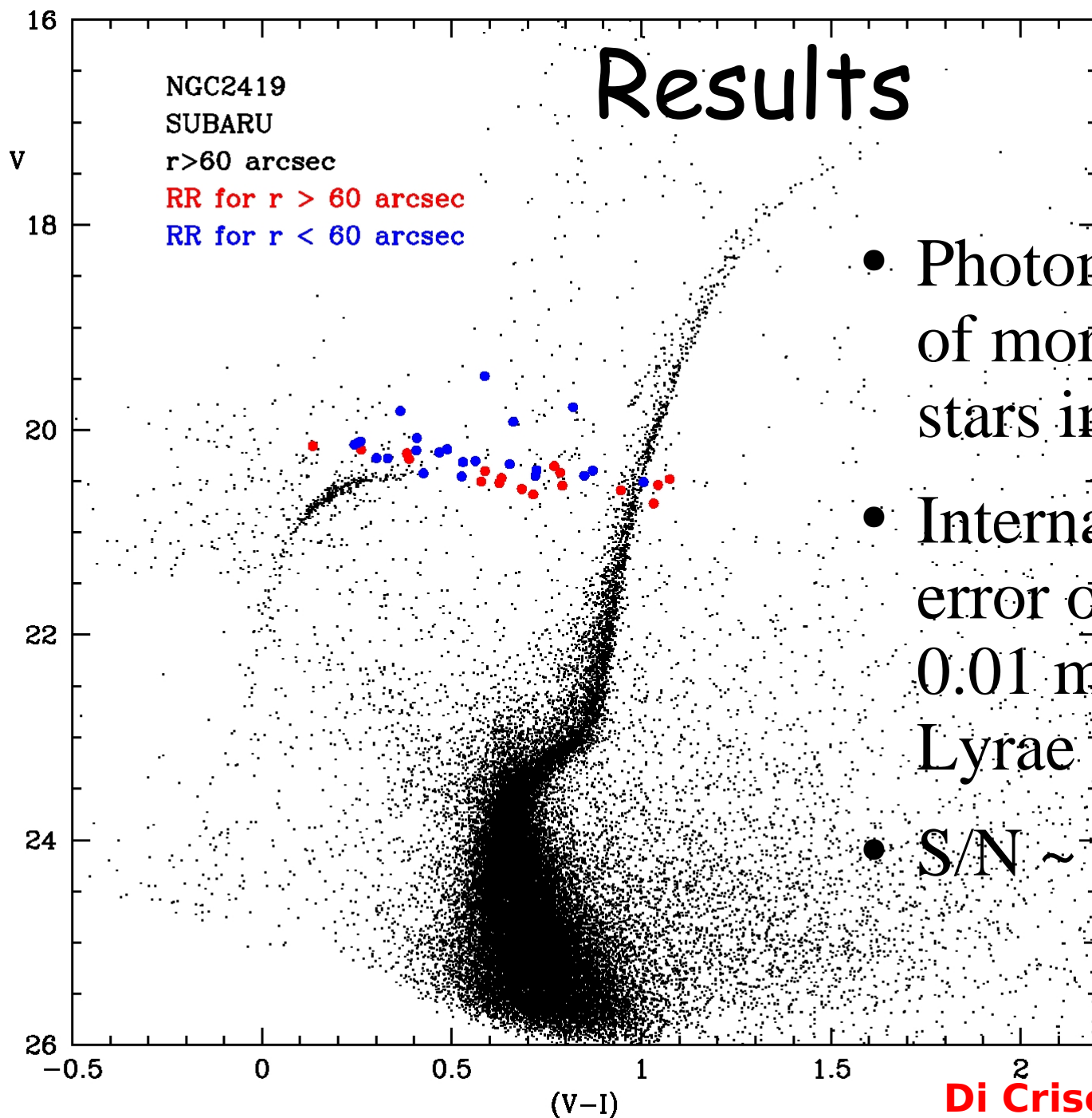
- 165 *V* and 16 *I*-band mosaics, with individual exposures ranging from 30 to 180 seconds
- Standard pre-reduction (overscan and sky flat-field) with IRAF ccdproc
- Only the CCDs containing the cluster were reduced

Photometry

- Individual PSFs estimated with DAOPHOT, by means of an automatic pipeline, based on Unix scripts and SuperMongo macros
- *Manual* check of each PSF
- About 4 months of man equivalent time needed to complete the PSF analysis
- Final photometry with ALLFRAME
- A week required on a fast dedicated PC-Linux to run ALLFRAME

Variable stars search

- Search of bright variables with the Stetson' index, based on the ratio of the dispersion of the measurements to the internal accuracy: genuine variables do show a large scatter (they vary their brightness!)
- *Manual* check of each candidate variable
- Search of faint variables with ISIS
- *Manual* check of the candidate variables. A lot of spurious detections
- Several months needed to build accurate light curves



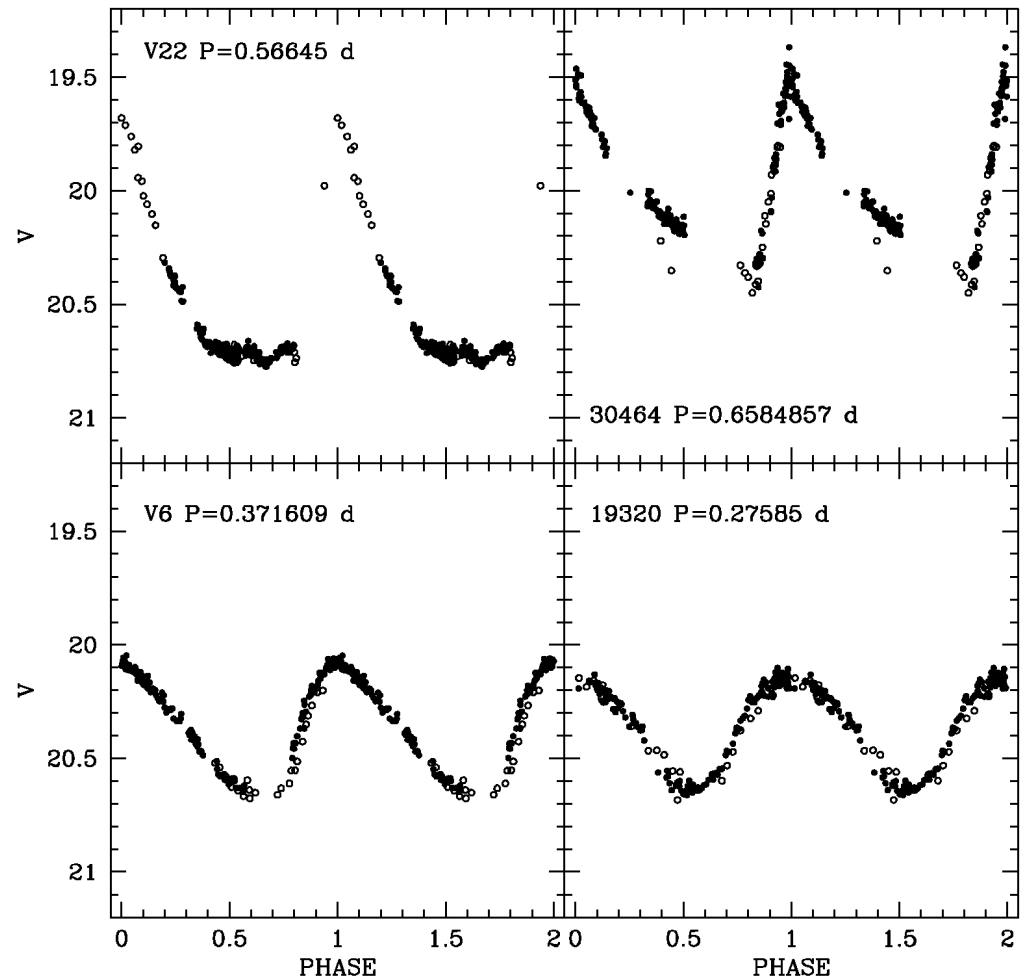
- Photometric catalogue of more than 60,000 stars in the V-band
- Internal photometric error of the order of 0.01 mag at the RR Lyrae level
- S/N ~ 10 at V ~ 26 mag

Di Criscienzo et al., *in prep.*

Results

Di Criscienzo et al., *in prep.*

- 68 confirmed variables (32 new discoveries)
- Very accurate light curves
- Very accurate mean properties
- Very accurate comparisons with the theoretical predictions



Our Experiment

We plan to perform a full reduction from scratch with Astro-Wise:

- How much computing time is needed?
- Check of the photometric accuracy: comparison of the color-magnitude diagrams
- Check of the variable search with VODIA: will we found the same number of variables? How much affordables are the detections?
- Fast reduction of the other chips of the mosaics: is the photometry clean enough to unveil tidal tails (if any)?

Schedule

- Start of the experiment: February 2007
- First reports to the OAC Community: March 2007
- End of the experiment: June 2007 ???
- Communications to the AW Community : ASAP!

Next STEP....

- STEP is a project devoted to a comprehensive study of the Small Magellanic Cloud and of the Bridge toward the Large Magellanic Cloud. We plan to use the VST to image 65 squared degrees on both targets to $V \sim 24.5$ with $S/N \sim 10$ in two years.
- 170 hours planned in two years in the B, V, i' bands, with 38 hours of VLT multi-object follow-up spectroscopy

..and STREGA

- STREGA will cover an area of about 150 sq. deg. searching for the southern portion of the Fornax Stream. It will also allow the study, at increasing Galactic latitudes, of Disk and Halo white dwarfs and interacting binaries, and it will provide an invaluable database to compare the star counts with the predictions of the Galactic models.
- 365 hours planned over 4 years in the u, g, r, i', v *Stromgren*, $H\alpha$ bands, with spectroscopic VLT and photometric VST follow-ups

Further experiments

- Galactic Globular Cluster NGC 4147
- 8 Suprime-Cam V,R images
- Color-Magnitude diagram
- Search for tidal tails
- Ursa Minor dSph
- 11 Suprime-Cam mosaics, in the Sloan g,i bands
- Multi-band Color-Magnitude diagrams, and comparisons with already available wide-field photometry

Conclusions

- High-accuracy already available *ALLFRAME* photometry of NGC 2419 will be used as a reference for the *Astro-Wise* pipeline
- Known variables will be searched with *VODIA*
- The results of the experiments will give an invaluable know-how when *Astro-Wise* will be used with the *STEP* and *STREGA VST* Surveys