



Tacande Observatory, La Palma

[www.astropalma.com](http://www.astropalma.com)

## Palomar Globular Clusters

Like Abell's planetary nebulae, Palomar globular clusters were discovered in the 1950's on the recognition plates of the Palomar Observatory's first observation of the sky using the Schmidt (POSS) camera. The list of astronomers who first identified objects as globular groups includes some famous names, including Edwin Hubble, Walter Baade, Fritz Zwicky, Halton Arp and George Abell. Several of the Palomar globular - such as Palomar 6, Palomar 7, Palomar 9, Palomar 10 and Palomar 11 - are medium-sized close clusters that turn out to be very much obscured by dust in our line of sight. Others - including Palomar 3, Palomar 4 and Palomar 14 - are globular giants that are far away in the extreme outer halo of the Milky Way. Although objects vary greatly in degree of difficulty - from easy to very difficult - observing the entire list is a very challenging observation project for medium-sized telescope owners.

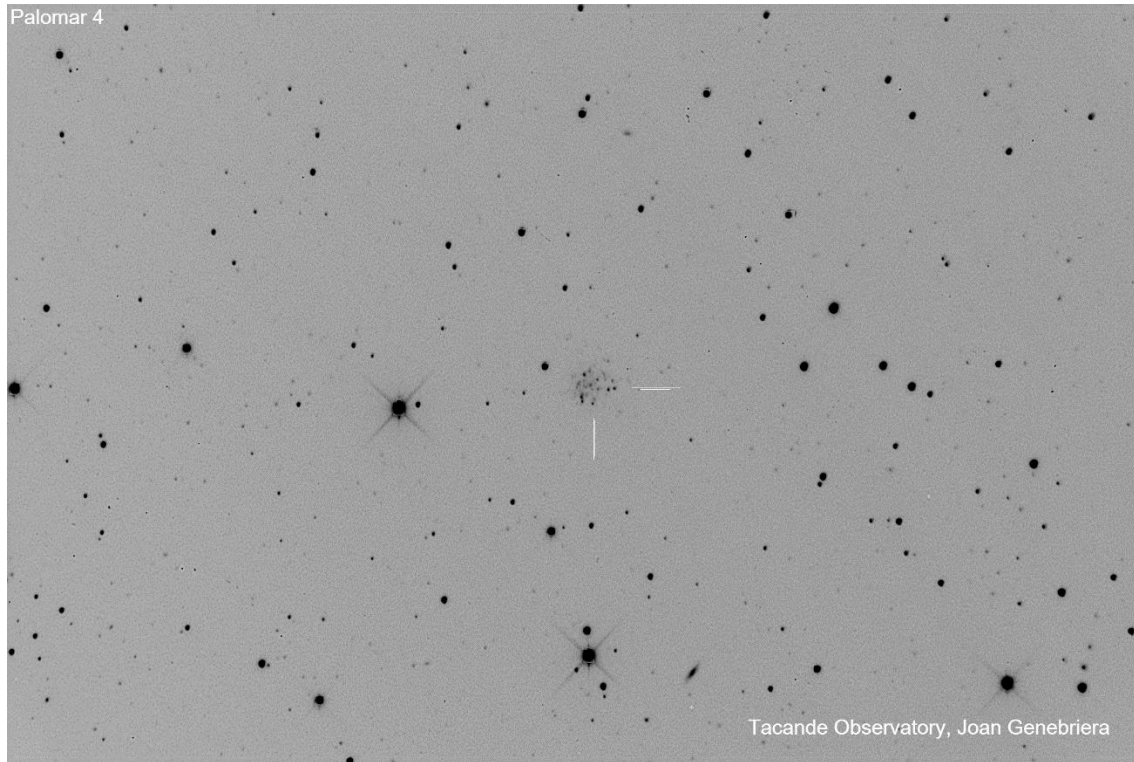
Palomar Clusters Table

<b>PAL</b>	<b>CON</b>	<b>RA</b>	<b>DEC</b>	<b>MAG1</b>	<b>MAG2</b>	<b>SIZE</b>
01	CEP	03 33 23.0	+79 34 50	13.6	16.3	2.8
02	AUR	04 46 05.8	+31 22 55	13.0	18.8	2.2
03	SEX	10 05 31.4	+00 04 17	13.9	18.0	1.6
04	UMA	11 29 16.8	+28 58 25	14.2	18.0	1.3
05	SER	15 16 05.3	-00 06 41	11.8	15.5	8.0
06	OPH	17 43 42.2	-26 13 21	11.6	n.a	1.2
07	SER	18 10 44.2	-07 12 27	10.3	15.7	8.0
08	SGR	18 41 29.9	-19 49 33	10.9	15.4	5.2
09	SGR	18 55 06.0	-22 42 06	08.4	14.0	5.4
10	SGE	19 18 02.1	+18 34 18	13.2	18.0	4.0
11	AQL	19 45 14.4	-08 00 26	09.8	n.a	10.0
12	CAP	21 46 38.8	-21 15 03	11.7	14.6	2.9
13	PEG	23 06 44.4	+12 46 19	13.8	17.0	0.7
14	HER	16 11 04.9	+14 57 29	14.7	17.6	2.5
15	OPH	16 59 51.0	-00 32 31	14.2	17.1	3.0

MAG1 = Integrated V Mag of Cluster / MAG2 = V Mag of Brightest Stars

SIZE = Diameter in arc minutes

Palomar clusters are part of the most distant clusters of the Milky Way. AM1 of magnitude 15.8 in Horlogium, is the globular cluster known more distant, is to 397,000 ly. and follows Palomar 4, as the second most distant globular of the Milky Way to 356,000 ly. Both reside in the extreme halo of our galaxy, beyond the Magellan clouds.



*Image of PAL 4. The most distant cluster of the Palomar series, credit ORT*

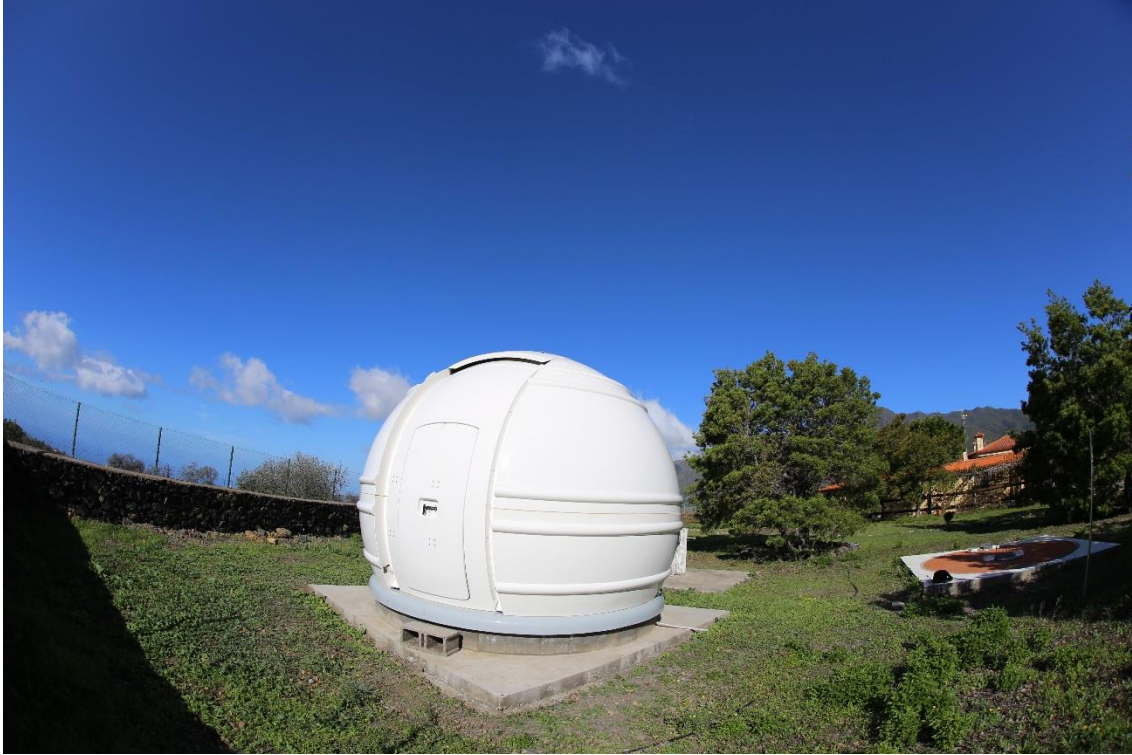
#### INSTRUMENTAL NOTES:

For this work, a 50 cm Newtonian ASA reflector telescope was used. Of diameter to f / 2.9 from the Robotic Observatory of Tacande (ORT) in La Palma. Canary Islands. The CCD camera used was a FLI-ML3200.

I want to thank Kevin Hills, owner of the ORT, for allowing me to use his telescope to post the present paper. Thank you!

For each final image 4 images of 180 seconds were integrated through a V photometric filter. Due to the distribution of the clusters throughout the sky, this work requires 1.5 years to complete (without rush). The magnitude reached in the weaker stars is 20 V, with an SNR of 4.3

No special type of post image processing was used.

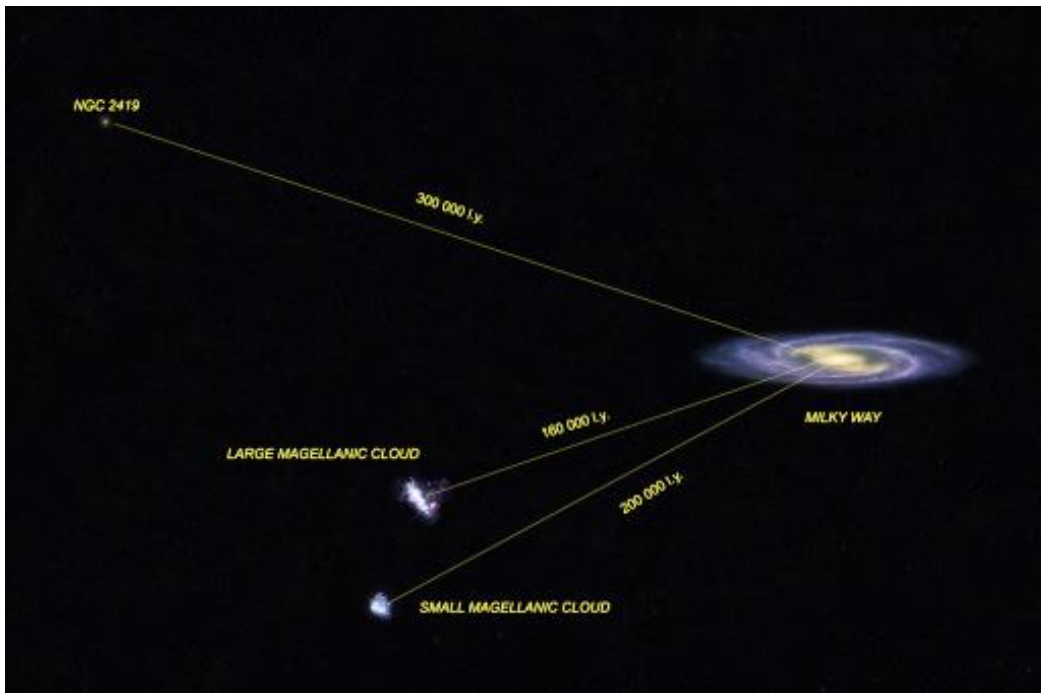


*Tacande Robotic Observatory, TRO*



*TRO telescope*

A possible suggestion for those interested in this type of work and also a good test to begin with may be the cluster NGC 2419 in Lynx of magnitude 10.4 at 274,000 ly. distance.



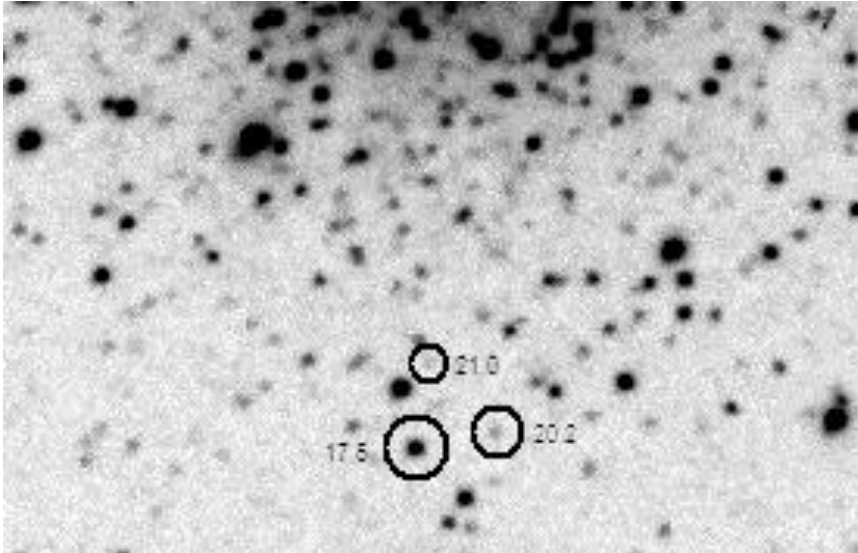
*Distribution of some objects in the Milky Way galactic halo*



*Image of NGC 2419, credit Tacande Observatory*

The previous image of NGC 2419 was taken from the Tacande Observatory, using a 400 mm diameter Cassegrain relay telescope at f / 6.5 The CCD camera was a SBIG ST8XE and the exposure time a single shot of 900 sec.

Processing the image with the Lucy-Richardson algorithm achieves the magnitude 21.0 with a SNR of 2.9 which indicates the possibility that these kinds of jobs can be carried out from dark skies sites and 16" telescopes.



*Southern region of NGC 2419 with indication of magnitudes*

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