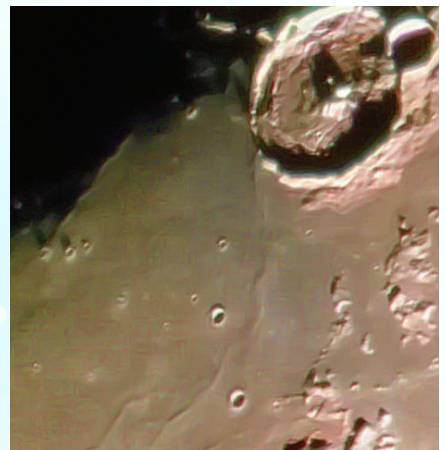
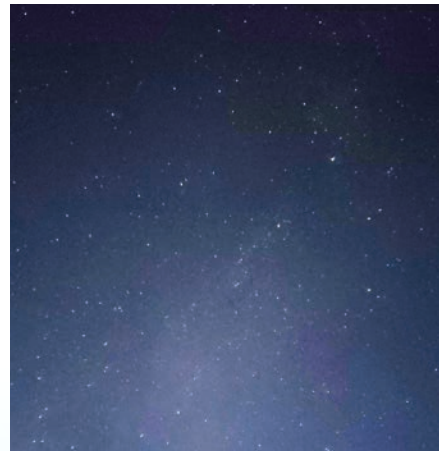


EXPLORE SMARTPHONE ASTROPHOTOGRAPHY





An Introduction to Smartphone Astrophotography

Smartphone camera technology advances each year. Now, the newer generations of smartphone are ideal for astrophotography because they have extended faint light performance. The camera that comes with the phone, called the 'native camera', often has a 'pro' setting where users can manually adjust the exposure speed and ISO. Although tripods and camera brackets are recommended to avoid the jitter from hand-held cameras, for some situations you can get acceptable photos just by shooting at 1-second or faster.

Below are some popular examples of objects to photograph and a few tips for taking some surprising photos, like the ones on the front of this handout.

Starfield Photography

One of the easiest and most fun experiments with astrophotography is photographing the sky and entire constellations. Hold your camera to the sky and take a 1s, ISO 800 photo and you will be surprised how many stars you will capture. This method gives very good results even with a hand-held camera set to ISO 600 and exposures under 4 sec to avoid jitter. For best results, use a camera tripod and a tripod adaptor. If the sky is moonless, set your camera for ISO >600 and exposures >5 seconds to capture dramatic pictures.

Other side, middle row left: Orion star field, iPhone 6s phone on a tripod; Camera+ app, manual setting: 2sec at ISO 2000. Limiting magnitude is +3.0m (Sten Odenwald). Middle row center: Orion star field. Samsung s9+ phone on a tripod. Native camera adjusted to 10s and ISO 800. Limiting magnitude is +5.0 (Sten Odenwald). Middle row right: Cygnus star field with Samsung S9+ phone on a tripod shot at 10s at ISO 640 (Sten Odenwald).

Contribute your own photos and measurements to these NASA-supported citizen science projects:

Satellite Streak Watcher:

<https://scistarter.org/satellite-streak-watcher>

NASA Night Sky Light Pollution:

<https://tinyurl.com/ygah4h76>

Citizen Science Month • April 2020

For more information about NASA citizen science, please visit: <https://science.nasa.gov/citizenscience>

General Astrophotography

Taking a photo of the moon with no telephoto or telescope will only show an unfocussed blob in the sky if you try to magnify it, but it can make for an interesting picture. The best image requires a 12x telephoto for your smartphone, and a tripod to steady your camera. The telephoto can be obtained for \$15–\$20 and there are dozens of vendors. Try to avoid the clip-ons to prevent the lens slipping around on the camera body. Instead use an adaptor that has its own camera bracket.

A small telescope with a 117 mm (3-inch) or larger aperture with 8 or 24mm lenses is perfect for magnified views of the moon, planets, and some of the brighter deep-space objects like the Pleiades star cluster or the Orion Nebula. A camera bracket can be helpful, but for some bright objects like the moon simply hold the camera to the eyepiece then select a fast setting above 1/30s and ISO 500 to get un-jittered pictures.

Other side, top row left: The moon with an 8-inch telescope and an iPhone XS (Spencer Collins). Top row Middle: 12x telephoto on a tripod with an iPhone 6s (Sten Odenwald). Top row right: Jupiter through a 12-inch telescope and a Redmi 3S phone (Bhushan Karmarkar). Bottom left: Pleiades with a 3-inch telescope and a Galaxy S8 phone (Paul Gibbs). Bottom middle: Orion Nebula with a 16-inch telescope and a Pixel 3 phone (Jim Preusse). Bottom right: Gassendi crater on the moon with a 6-inch telescope and a Galaxy S10 phone (Michael Armentrout).

Contribute your own photos to this NASA citizen science project: <https://tinyurl.com/yh8bkaya>

NASA Citizen Science Projects

Citizen science projects are scientific collaborations between scientists and interested members of the public. Most projects require no prior knowledge, experience, or special tools beyond a computer or cell phone. Some projects invite you to use your smartphone to photograph or record information and upload this data to a project website. If you're ready to join a project, go to one of the URLs listed here and get started.



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