



# THE STAR DIAGONAL

THE JOURNAL OF THE OGDEN ASTRONOMICAL SOCIETY



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## Meeting Announcement

There will be no monthly meetings for July or August. We look forward to seeing you at Great Basin National Park.

## President's Message

Hi All,

I am a discouraged President we have had two star parties in a row that had one or two members attend. First was Antelope Island we had a very good turnout for the white rock bay Star Party and clear skies but Steve Martin and myself were the only club members that attended we did get lucky and had some other folks show up with scopes but they were not members. Second was a paying event for Summit and I was the only one to attend, I did not charge because of this so our club has lost out on money. So I guess it's time to ask ourselves do we have to many parties or are we just going through a funk for some reason. Do we need to cancel upcoming parties because of lack of interest, A very few of us put in a

lot of time to make things happen for the club and when we cannot even receive a little support it becomes frustrating and discouraging. With that said I am very happy my time as President is coming to an end.

Clear Skies  
Craig

## Star Party Schedule

Public Star Parties are as follows.

Aug 2	Antelope Island
Sep 27	Antelope Island
Oct 18	Antelope Island

Our Requested Star Parties (Schools, etc).  
9/5                      Park City Girl Scouts

Our Private Star Parties are as follows.

Jul 25-28	Great Basin
Aug 22-24	Monte Cristo
Sep 18-20	Great Basin Astronomy Festival
Oct 24-26	Curlew

## Great Basin National Park Star Party

We have a star party at Great Basin National Park from July 24 through Sunday morning July 27. I am should get all the details in the next couple of days and I will send them out on OAS\_News. Please watch for them. Please let me know if you are planning to attend.

## A Glorious Gravitational Lens

By Dr. Ethan Siegel

As we look at the universe on larger and larger scales, from stars to galaxies to groups to the largest galaxy clusters, we become able to perceive objects that are significantly farther away. But as we consider these larger classes of objects, they don't merely emit increased amounts of light, but they *also* contain increased amounts of **mass**. Under the best of circumstances, these gravitational clumps can open up a window to the distant universe well beyond what any astronomer could hope to see otherwise.

The oldest style of telescope is the refractor, where light from an arbitrarily distant source is passed through a converging lens. The incoming light rays—initially spread over a large area—are brought together at a point on the opposite side of the lens, with light rays from significantly closer sources bent in characteristic ways as well. While the universe doesn't consist of large optical lenses, **mass itself** is capable of bending light in accord with Einstein's theory of General Relativity, and acts as a *gravitational* lens!

The first prediction that real-life galaxy clusters would behave as such lenses came from Fritz Zwicky in 1937. These foreground masses would lead to multiple images and distorted arcs of the same lensed background object, all of which would be magnified as well. It wasn't until 1979, however, that this process was confirmed with the observation of the Twin Quasar: QSO 0957+561. Gravitational lensing requires a serendipitous alignment of a massive foreground galaxy cluster with a

background galaxy (or cluster) in the right location to be seen by an observer at our location, but the universe is kind enough to provide us with many such examples of this good fortune, including one accessible to astrophotographers with 11" scopes and larger: Abell 2218.

Located in the Constellation of Draco at position (J2000): R.A. 16h 35m 54s, Dec. +66° 13' 00" (about 2° North of the star 18 Draconis), Abell 2218 is an extremely massive cluster of about 10,000 galaxies located 2 billion light years away, but it's *also* located quite close to the zenith for northern hemisphere observers, making it a great target for deep-sky astrophotography. Multiple images and sweeping arcs abound between magnitudes 17 and 20, and include galaxies at a variety of redshifts ranging from  $z=0.7$  all the way up to  $z=2.5$ , with farther ones at even fainter magnitudes unveiled by Hubble. For those looking for an astronomical challenge this summer, take a shot at Abell 2218, a cluster responsible for perhaps the most glorious gravitational lens visible from Earth!

*Learn about current efforts to study gravitational lensing using NASA facilities:*

<http://www.nasa.gov/press/2014/january/nasas-fermi-makes-first-gamma-ray-study-of-a-gravitational-lens/>

*Kids can learn about gravity at NASA's Space Place:* <http://spaceplace.nasa.gov/what-is-gravity/>



*Abel 2218. Image credit: NASA, ESA, and Johan Richard (Caltech). Acknowledgement: Davide de Martin & James Long (ESA/Hubble).*