Open meeting and introduce new members (get names, email)
- Club Business
- Interesting observations, experiences
- Show and tell
- Current news and what’s in our sky this month: Member input + Newsletter
- Events, outreach
  - Report on the 05/21/22-Sun Party at TPML
  - JBSA/NBAC opportunities
    - Report on the 06/04/22-Star Gazing event at Joint Base San Antonio-Canyon Lake
    - Next JBSA Star Gazing event 06/25/22
- Main feature(s)
  - Bob Keyser on Newsweek’s article about other potential civilizations in the Milky Way

Notes:

Coming up: OUR 274th ASTRONOMY CLUB MEETING
July 21st, 2022, from 6 - 8 pm
Bosses Pizza on Loop 337
astronomynbtx.org   Email: info@astronomynbtx.org
facebook.com/groups/354953995432792/
Astronomy Friends New Braunfels............
facebook.com/groups/166098014710276/
Comal County Friends of the Night Sky......
comaldarksky.org/  Email: info@comaldarksky.org
New Braunfels Astronomy Club Because it’s Out There

*NBAC’s 25th Year!*

NBAC Observing Calendar
Solar System Happenings
Watch the ISS
My Celestial Pick
Astrophotography
Lagniappe

Cover Story> Aurorae
**JUNE/JULY 2022**

<table>
<thead>
<tr>
<th>SUN</th>
<th>MON</th>
<th>TUE</th>
<th>WED</th>
<th>THU</th>
<th>FRI</th>
<th>SAT</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td><strong>16</strong></td>
<td><strong>17</strong></td>
<td><strong>18</strong></td>
</tr>
</tbody>
</table>
| **On the Cover**  
March 2002 - Solar Cycle 23.  
This image was taken outside Fairbanks, AK while on an Astronomy Magazine Aurora tour. |     |     |     | NBAC Meeting 6:00 | Bosses Pizza-Loop | 337 |
|     |     |     |     |     |     |     |
| **This June & July are “morning sky” months as expansive views of planetary line-ups occur well before sunrise.** |     |     |     |     |     |     |
| **19** |     | **20** | **21** |     |     | **24** |
|     |     |     |     |     |     |     |
| **Summer Solstice**  
Most daylight hours of the year |     |     |     |     |     |     |
| **26** | **27** | **28** | **29** | **30** |     |     |
|     |     |     |     |     |     |     |
|     | **03** | **04** | **05** | **06** | **07** |     |
|     |     |     |     |     |     |     |
|     | **10** | **11** | **12** | **13** |     | **16** |
|     |     |     |     |     |     |     |
| **Dawn, July 14–16**  
45 minutes before sunrise | **19** | **20** |     |     | **21** |     |
| **Dawn, June 25–27**  
30 minutes before sunrise |     |     |     |     |     |     |
| **Sky & Telescope** |     |     |     |     |     |     |

*This page contains the calendar for June and July 2022, including events and astronomical observations.*
**Solar System Happenings**

- **Mercury** is a morning planet, joining the other planets in a line-up as the eastern anchor. It rises later and later in the morning as July progresses and gets lost in the Sun’s glare.
- **Venus** is bright in the eastern morning sky, posing with the other planets.
- **Earth** still spins, and we are still here to marvel at it all.

**Best ISS viewing for New Braunfels (works for Canyon Lake too)** - From Heavens Above

<table>
<thead>
<tr>
<th>Date</th>
<th>Start Time</th>
<th>Start Loc</th>
<th>Max Alt °</th>
<th>End Loc</th>
<th>Note</th>
</tr>
</thead>
<tbody>
<tr>
<td>06/21</td>
<td>05:36</td>
<td>S</td>
<td>25</td>
<td>ENE</td>
<td>VERY CLOSE TO VENUS!</td>
</tr>
<tr>
<td>07/11</td>
<td>05:36</td>
<td>NNW</td>
<td>15</td>
<td>E</td>
<td>VERY CLOSE TO VENUS!</td>
</tr>
<tr>
<td>07/11</td>
<td>22:15</td>
<td>SW</td>
<td>70</td>
<td>NE</td>
<td></td>
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<tr>
<td>07/12</td>
<td>21:26</td>
<td>SSW</td>
<td>52</td>
<td>NE</td>
<td>Close to Albireo in Cygnus</td>
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<tr>
<td>07/13</td>
<td>05:36</td>
<td>NW</td>
<td>42</td>
<td>ESE</td>
<td>Between Venus and Mars, close to the Pleiades</td>
</tr>
<tr>
<td>07/13</td>
<td>22:15</td>
<td>W</td>
<td>21</td>
<td>NNE</td>
<td></td>
</tr>
<tr>
<td>07/14</td>
<td>21:25</td>
<td>WSW</td>
<td>38</td>
<td>NE</td>
<td>Through the Big Dipper pointers and close to Polaris</td>
</tr>
<tr>
<td>07/15</td>
<td>05:35</td>
<td>NW</td>
<td>47</td>
<td>SSE</td>
<td>5 degrees from Saturn</td>
</tr>
</tbody>
</table>

- **The Moon** dances with planets and stars.
- **Mars** is a morning planet in the east-southeast, joining the other planets.
- **Jupiter** is a east-southeastern morning planet, teaming up with other planets.
- **Saturn** is in the pre-dawn sky – anchoring the south-southeastern end of this planetary line-up.
- **Uranus** is a morning planet, positioned between Venus and Mars – use binoculars or telescope.
- **Neptune** is a morning planet in the south, between Jupiter and Saturn – use binoculars or telescope.

**Comet(s)**

- PanSTARRS (C/2017 K2) is from the Oort Cloud. Mag 8+
Cover Story

Aurorae – Light Show in the Sky

Have you experienced an aurora? If you have, you know they can be better than the best laser lightshow ever! Let me give a brief description from one March 2002 experience in Alaska.

It’s around 2 am in a parking lot just outside Fairbanks. Our group has been hanging out there for about an hour. A little spot of light appears near the horizon. Nothing else going on, sky is clear, and oh, it’s cold. I turn away to chat with another aurora hopeful and she exclaims, oh look! I turn back and see the spot has morphed into a short, thick rope. It is moving slowly but moving, and soon the rope becomes a greenish S-shaped nebula, now extending about a quarter of the sky. The nebula expands into a fat, glowing, meandering greenish river in the sky, with a curtain of waterfall coming off one side. I hear exclamations of amazement...coming from me!

Our Sun has an activity cycle that spans approximately 11 years from maximum to minimum and back to maximum. Some of the attributes of a solar maximum are frequent sunspots, flares, and coronal mass ejections (CME). When our Sun is in an active mode, especially during solar maximum, the likelihood of witnessing a spectacular aurora is very good (for folks living way north of Texas). A strong solar outburst (flare or CME) in Earth’s direction can result in visible aurorae farther south. 2002 was a good year, being near the peak of solar cycle 23. Solar cycle 24 was a bit of a flop. In fact, cycle 24 had the fewest sunspots since cycles 12 to 15 (1878-1923).

Special Event! Planets in a Line-up

Starting in June, six planets (four are naked eye) line up! You will need binoculars or a telescope to see Uranus and Neptune. After June 24 Mercury starts rising later and gets lost in the Sun’s glare around July 8.
There was concern that the Sun might be headed toward an extended solar minimum. If this happened, there would still be aurorae, but with lower intensity. Another affect might be on Earth’s climate. Two previous long-term solar minimums, Maunder (1645-1715) and Dalton (1790-1820) coincided with lower planetary temperatures and crop failures in northern latitudes, but there is no conclusive evidence they caused it.

Aurorae are caused by the interaction of solar wind (free electrons and protons) and magnetospheric plasma with high altitude atmospheric oxygen and nitrogen, 60-180 miles up. The interactions cause excitation of atomic oxygen (O) and molecular nitrogen (N$_2$). Then, as they return to their ground state a photon (light) is emitted. The prevalent color is green (our eyes are conveniently most sensitive to green), with red, blue, pink, purple, even yellow colors occurring. Complex factors determine which atmospheric component produces a given color.

This activity is focused along Earth’s magnetic field lines and is most intense in a ring between 10 and 20 degrees from each magnetic pole. In the north, it’s called Aurora Borealis, in the south it is called Aurora Australis.

For a long time, it was thought that northern and southern aurorae were mirror images of each other. NASA took simultaneous videos of both in 2005, showing they are quite different.

-Eric Erickson

My Celestial Pick: NGC 5139/Omega (ω) Centauri

OK, this is also a Celestial Challenge! We are just far enough south to catch Omega Centauri above the horizon in our south-southwestern sky. A clear view of the southern horizon is crucial, and getting to one will pay off with a view of arguably the most impressive globular cluster in our sky. After 9pm use binoculars to scan from south to south-southwest above the horizon. Catch it soon, it’s getting lower and lower.
**Imagining Imaging**: Platform for club imagers...images and imagers needed!

March 2002, Solar Cycle 23, Fairbanks, AK

This is the original image of my cover photo, cropped for the cover. I was in my later years with analog photography. Moved to digital three years later.

Tripod mounted Minolta SRT 101, Tokina ATX 24-40mm f2.8 @24mm/ f2.8, Fuji color 800, 30 seconds. I used this fully manual camera instead of my automated Minolta X-700 due to the very cold temperature that would have quickly frozen the X-700 batteries and possibly the electro-magnetic shutter motor, making the automatic camera essentially useless.

Negatives scanned with Plustek Opticfilm 7600i scanner/Hamrick Vuescan software. Saved as JPEG for small file size use.

Sharpness/contrast/vibrance/RBG curves adjustments in Photoshop
Gramps just mistakenly received a credit card with a $2 billion limit!