



Content

- [Home](#)
- [Projects](#)
- [LabNotes](#)
- [Press Releases](#)
- [In the News](#)
- [Outreach](#)
- [Media](#)
- [Library](#)
- [Software Tools](#)
- [Data](#)
- [Opportunities](#)
- [Calendars](#)
- [Centers](#)
- [About](#)

Main Projects

- [Habitable Exoplanets](#)
- [Visible Paleo-Earth](#)

Related Sites



Virtual Planetary
Laboratory



Center for Exoplanets and
Habitable Worlds



Habitability of Exoplanets
Research Group



Planetary Ecospheres

Press Releases >

A Planetary System Around Our Nearest Star is Emerging

posted Oct 16, 2012 3:06 PM by Abel Mendez Torres [updated Oct 18, 2012 8:33 AM]

Scientists are getting closer to discovering Earth-like planets close to Earth



The Alpha Centauri stellar system, being our closest stars, has been a long-time destiny of science fiction stories a first future human venture into planets around other stars. Unfortunately, many previous scientific efforts to detect these stars came just empty handed. Science fiction has not been supported by science, until now.

Today, a team of European scientists announces the discovery of the first planet around a star in the Alpha Centauri system. This new result opens the possibility that there might be other Earth-size planets in the Alpha Centauri system, including some potentially habitable.

The Alpha Centauri stellar system consists of three stars about 4.4 light years away. The largest two, Alpha Centauri A and B, are separated by 17.6 times the Sun-Earth distance in a highly elliptical orbit (almost the distance between the Sun and Proxima Centauri, is much farther away and many times considered not part of the system).

Alpha Centauri A and B are also very similar to our Sun with respect to their size, brightness, activity, temperature. Alpha Centauri A is 20% larger than the Sun while Alpha Centauri B is 10% smaller. Proxima Centauri is slightly closer to Earth than Alpha Centauri B, being a very dim red star nearly one-tenth the size of the Sun.

The new planet, Alpha Centauri Bb (Aif Cen B b for short), orbits the secondary star Alpha Centauri B with a period of 0.04 the Earth-Sun distance from the star. At this short distance, the planet receives about 310 times more light than Earth receives from the Sun, making its surface very hot, nearly 870°C, almost three times as hot as Mercury.

Out of the over 800 exoplanets (extrasolar planets) that have been detected and confirmed in the last twenty years, Alpha Centauri Bb is now not only the nearest one to Earth but also the closest to an Earth-mass around a Sun-like star. There are 11 other smaller exoplanets but around other type of stars. Previously, Epsilon Eridani b was considered the closest exoplanet, being 10.5 light years away, since the year 2000.

All known potential habitable exoplanets so far are superterrans (aka Super-Earths), which are two to ten times more massive than Earth. Scientists do not know if these superterrans are less habitable or even more habitable than Earth. The planets in such a mass range in our Solar System to compare to, our eight planets are either less or more massive.



Biospheric Theory and Modelling Group



Exolife

Astrobiology Centers

[NASA Astrobiology](#)
[ACA \(Australia\)](#)
[CAB \(Spain\)](#)
[IA \(Colombia\)](#)

Exoplanets Links

[Planet Quest](#)
[NASA EEP](#)
[NExSci](#)
[Exoplanets Encyclopedia](#)
[Exoplanet Data Explorer](#)
[NStED](#)

Astrobiology Seminars

[NAI Seminar Series](#)
[STSci Webcasts](#)
[SETI Colloquium](#)
[Stanford Astrobiology](#)

Astrobiology Societies

[ISSOL \(International\)](#)
[EANA \(Europe\)](#)
[Astrobiology Society \(US\)](#)
[SFE \(France\)](#)
[ASB \(UK\)](#)

Astrobiology News

[Astrobiology Magazine](#)
[Astrobiology Web](#)
[Astrobiology Network](#)
[Intl. Astrobiology Newsl.](#)

Local Sites

[UPR Arecibo](#)
[UPR](#)
[Arecibo Observatory](#)
[NASA PRSGC](#)
[PR-LSAMP](#)
[CienciaPR](#)

78

days since
 Curiosity Landing

(CC) 2012 PHL@UPRA

One of the main goals of exoplanet studies is to find terran planets in the Habitable Zone, those between 0.5 to 2 AU orbiting at the right distance from their parent star to support liquid water. These are worlds that we can understand better than the more exotic nature of superterrans.

*"This result represents a major step towards the detection of a twin Earth in the immediate vicinity of the Sun. *W times!*"* said Xavier Dumusque from the Geneva Observatory, Switzerland and Centro de Astrofísica da Universidade do Porto, lead author of the research.

This research was presented in a paper *An Earth mass planet orbiting Alpha Centauri B*, that appeared online in *Nature* on October 17, 2012.

The research team is composed of Xavier Dumusque (Observatoire de Genève, Switzerland; Centro de Astrofísica do Porto, Portugal), Francesco Pepe (Observatoire de Genève), Christophe Lovis (Observatoire de Genève), Damien Bouy (Observatoire de Genève), Johannes Sahlmann (Observatoire de Genève), Willy Benz (Universität Bern, Switzerland), Michel Mayor (Observatoire de Genève; Institut d'Astrophysique de Paris, France), Michel Mayor (Observatoire de Genève), Nuno Santos (Centro de Astrofísica da Universidade do Porto) and Stéphane Udry (Observatoire de Genève).

Resources

- Original ESO Press Release: [Planet Found in Nearest Star System to Earth](#)
- Nature News Article: [The exoplanet next door: Earth-sized world discovered in nearby \$\alpha\$ Centauri star system](#)
- Nature Research Paper: [An Earth mass planet orbiting Alpha Centauri B](#)
- [Habitable Exoplanets Catalog](#)

Images

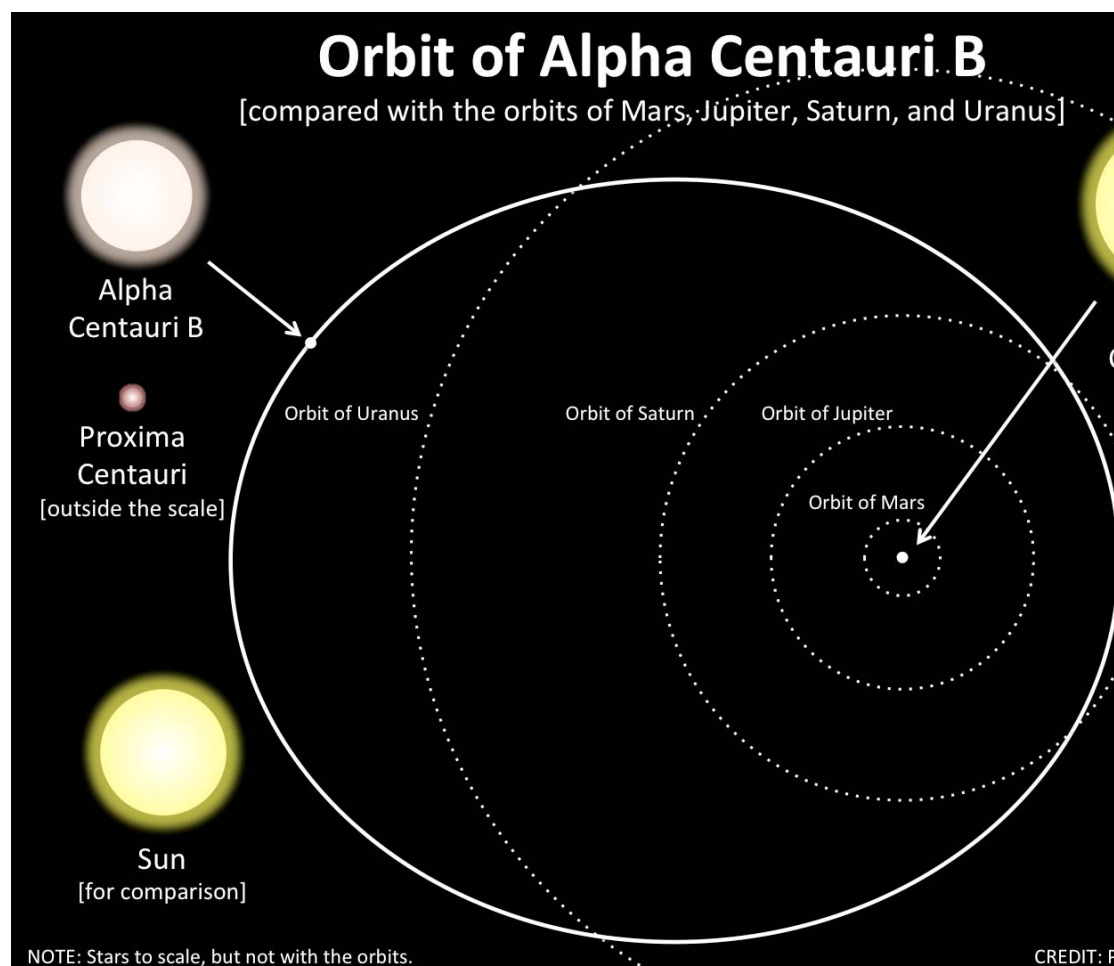


Figure 1. Comparison of the size and orbit of Alpha Centauri B around Alpha Centauri A. Alpha Centauri B nearly goes around Alpha Centauri A in a highly eccentric orbit. The orbit of the planet around Alpha Centauri B is so small that it is nearly invisible on this scale. Note: this image assumes a semi-major axis of 17.57 AU for the orbit of Alpha Centauri B, but other values have been suggested. CREDIT: PHL @ UPR Arecibo.

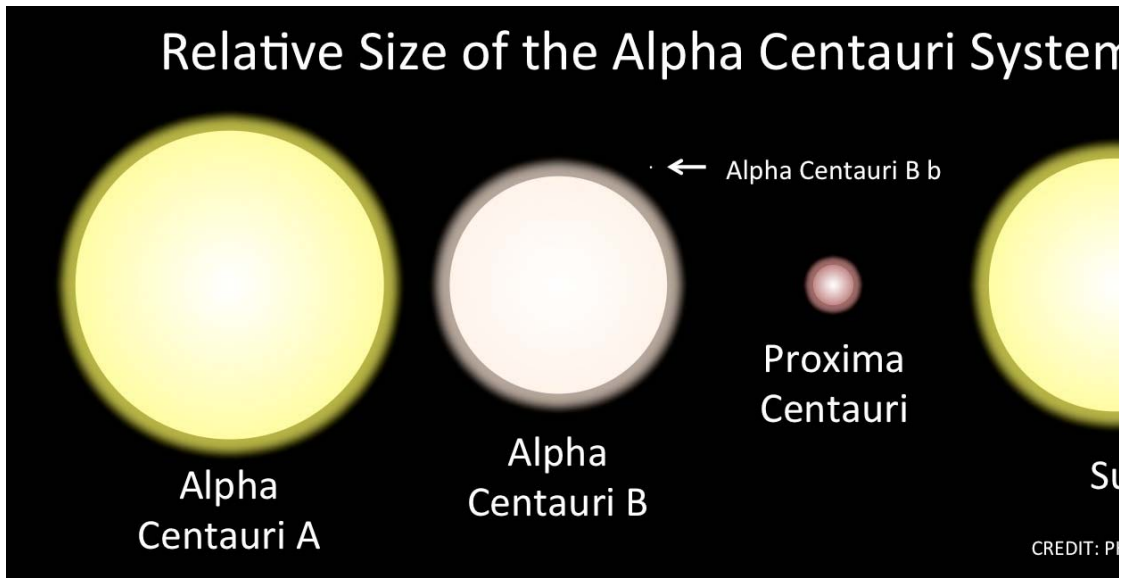


Figure 2. Relative size of the Alpha Centauri stars and its planet. The planet Alpha Centaury B b is also shown to s Earth-size. The Sun for comparison. CREDIT: PHL @ UPR Arcibo

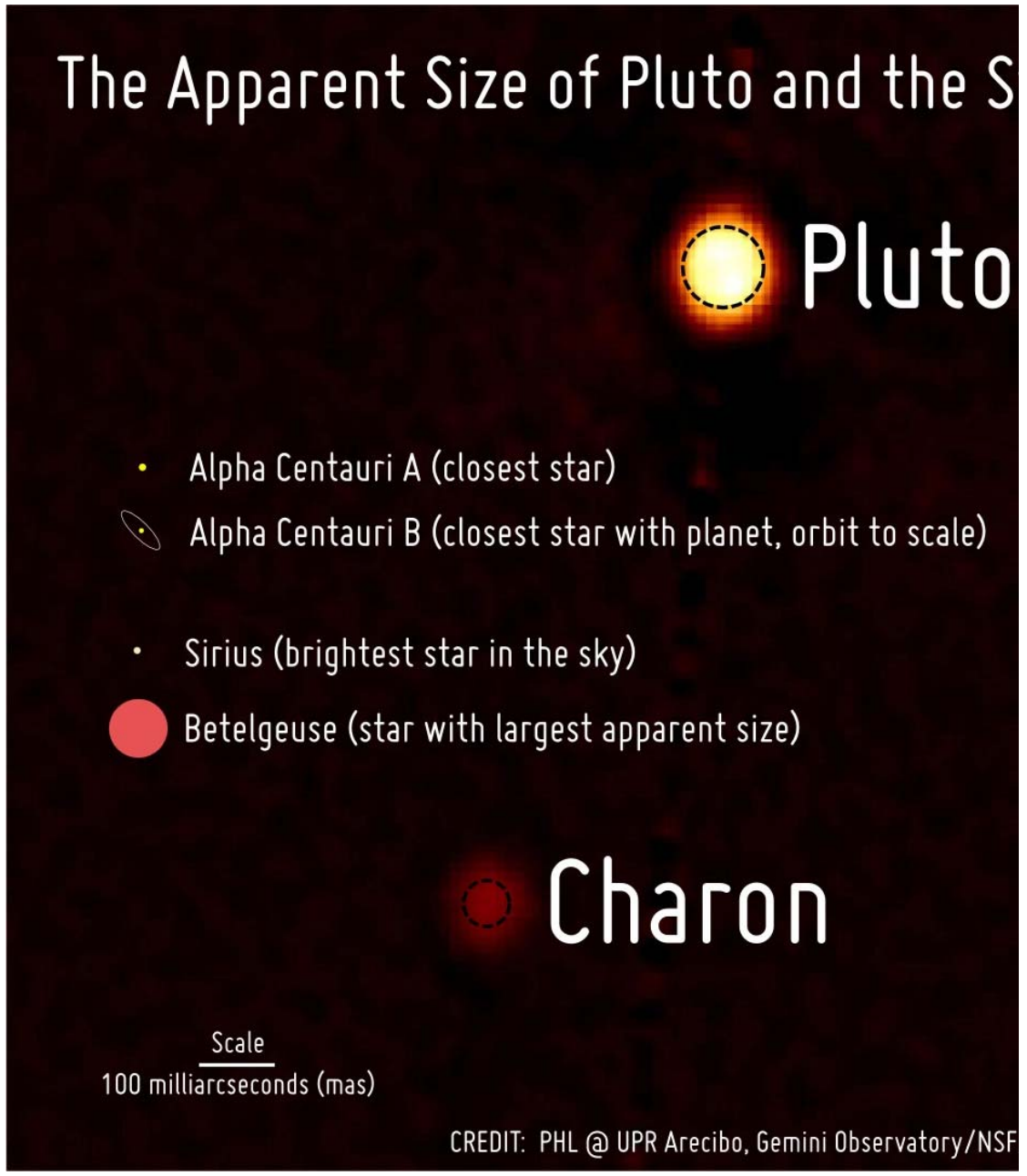


Figure 3. Star appears big in photos because of the scattering of light by the telescope's optics as well as in the CC

Atmospheric effects also distort them for ground observatories. In reality, they are small dots even smaller than that of Pluto, thus challenging our astronomical instruments limits. The orbit of Alpha Centauri B b, shown as an ellipse around Alpha Centauri B, is almost as large as Pluto as seen from Earth. Unfortunately, astronomers do not have the capability to detect the light from Alpha Centauri Bb from the star. Exoplanets are detected because they affect their parent star partially blocking it (transit method) or Doppler effects (radial velocity method). CREDIT: PHL @ UPR Arcibo, picture of Charon by the Gemini Observatory/NSF/NASA/AURA.

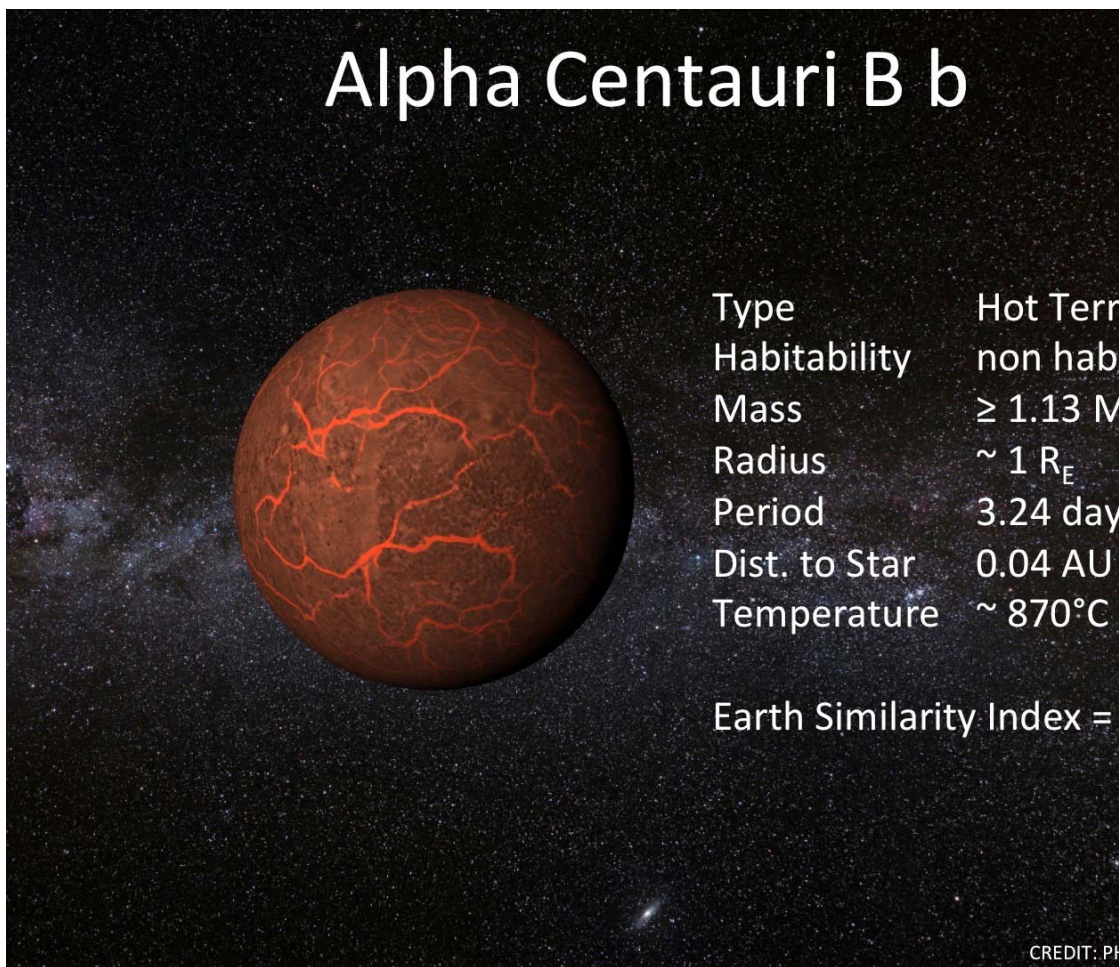


Figure 4. Measured and estimated properties of Alpha Centauri B b represented in this SER computer generated image. It is a tectonically active planet due to tidal heating. Its Earth Similarity Index (ESI) of 0.27, well below the 0.8 to be considered an Earth-like planet, shows that although it has a similar mass as Earth this is a very different world. CREDIT: PHL @ UPR Arcibo

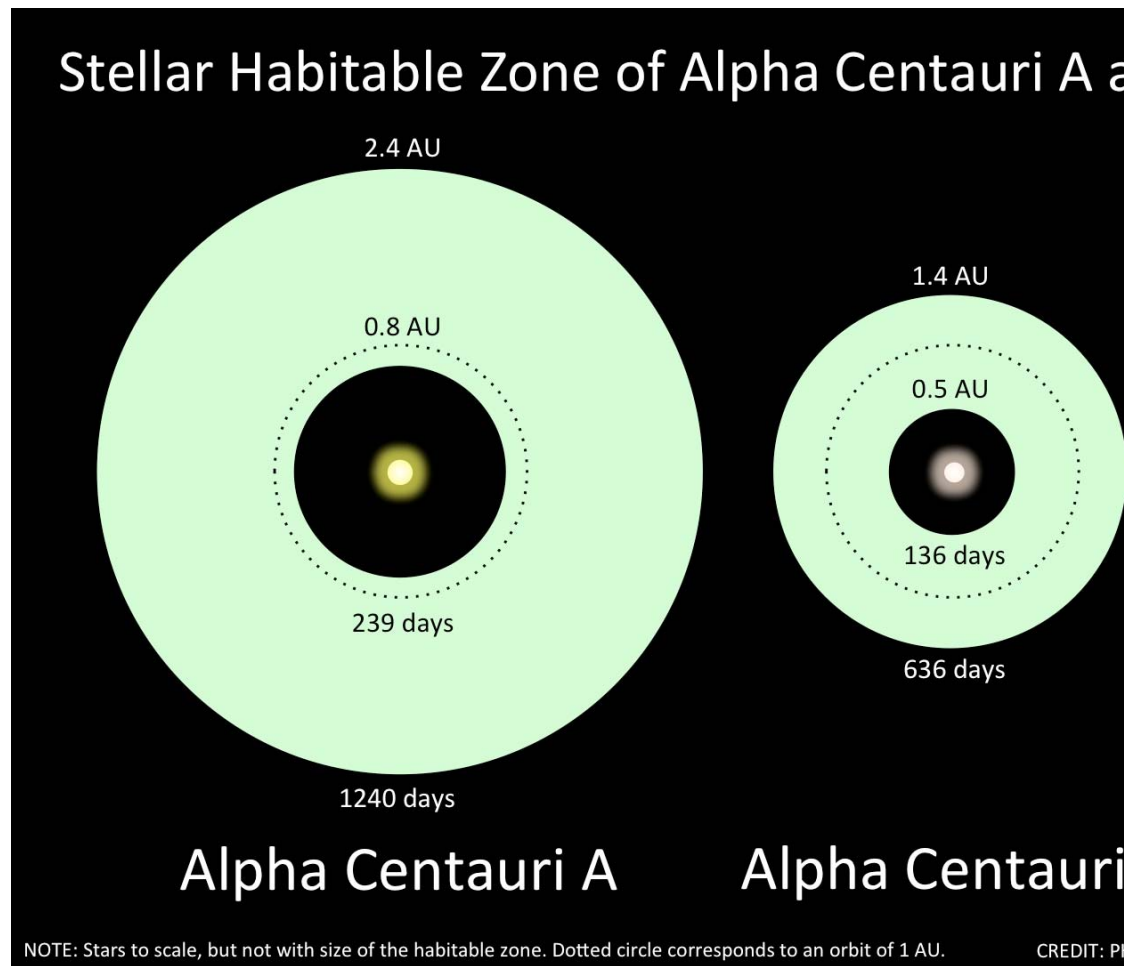


Figure 5. Comparison of the Stellar Habitable Zones (SHZ) of Alpha Centauri A and B. Planets need to have the right conditions within the green areas to be considered potentially habitable, or allow liquid water in their surface. The new planet Alpha Centauri B b, is too close to the star at 0.04 AU corresponding to a period of 3.2 days. Habitable planets around Alpha Centauri B need to be between 0.5 to 1.4 AU from the star or have a period between 136 to 636 days. Earth orbit, 1 AU, is shown as a dotted circle for reference (it looks smaller in the first circle but this is just an optical illusion, check with a ruler). CREDIT: PHL @ UPR Arcibo.

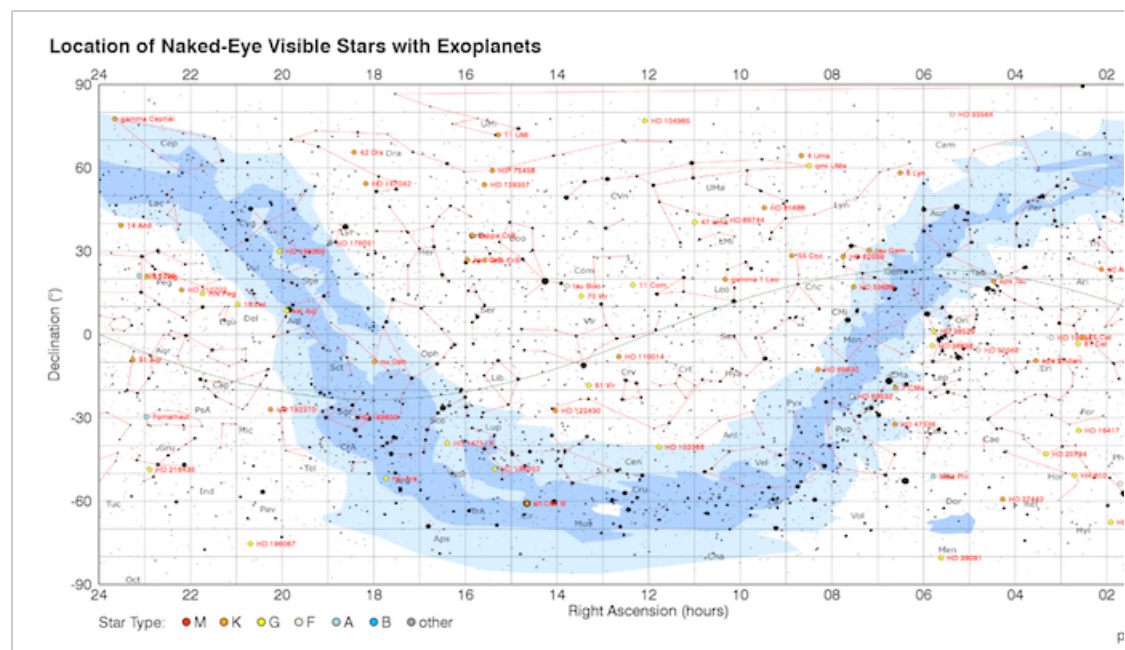


Figure 6. Sky map of the naked-eye visible stars with exoplanets (down to magnitude 6). The Alpha Centauri B star (Cent B) is nearly the 15 hours right ascension and -60 declination. CREDIT: PHL @ UPR Arcibo and [Jim Cornwell](#).

Contact

For inquiries regarding the images or to request higher resolution versions contact [Prof. Abel Méndez](#).



(CC) Planetary Habitability Laboratory @ UPR Arcibo, 2012

[Iniciar sessão](#) | [Denunciar Abuso](#) | [Imprimir Página](#) | [Remover Acesso](#) | Tecnologia do [Google Sites](#)