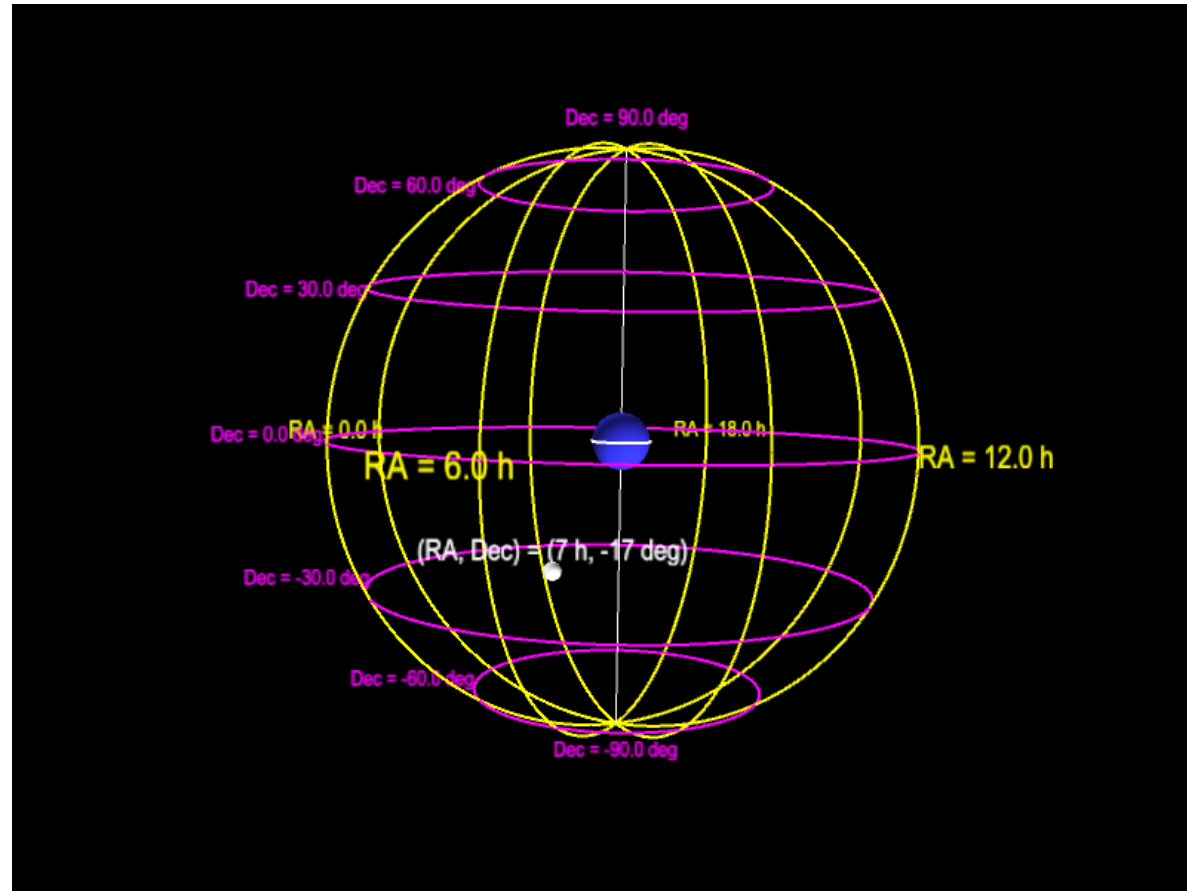


# The Celestial Sphere



# 1 Description

## 1.1 The celestial sphere

The celestial sphere is an imaginary sphere centred on the Earth onto which all stars (and other celestial bodies) can be projected. We use the celestial sphere to find objects in the sky. The celestial equator is an extension of the Earth's equator, and the north and south celestial poles are extensions of the Earth's north and south pole.

The celestial sphere uses the equatorial coordinate system, with coordinates of right ascension (RA) and declination (dec), which are extensions of the Earth's longitude and latitude lines respectively. RA is measured in hours, minutes and seconds of time, since it takes about one day - or 23 hours 56 min 4.1 sec - for a star to reappear at the same point in the sky (since a sidereal day is about 3 min 56 sec shorter than a mean solar day). Dec is measured in degrees, arcminutes and arcseconds, with +dec used for objects in the northern celestial sphere, and -dec used for objects in the southern celestial sphere. (In this 3D PDF, vertical lines of right ascension are marked in yellow every 3 hours, and horizontal lines of declination are marked in magenta every 30 degrees.)

The location of a celestial object in equatorial coordinates is given by its (RA,dec) position on the celestial sphere. For example, the star Sirius is located at (RA= 06h45m09s, dec= -16deg42'58"), or approximately (7h,-17deg), in the constellation of Canis Major.

## 1.2 How to use this 3D PDF

The interactive 3D content appears on the next page of this document. You can interact with the 3D content in a variety of ways. Most of these can be found in the 3D toolbar (see below) that appears when you move the mouse cursor over the 3D figure.



To start, click and hold the left mouse button anywhere within the 3D figure. Then move the mouse around and see how the orientation changes. You can use the right mouse button in the same way to zoom in and out. Other interaction modes are also available. You can explore these by clicking on the drop-down menu of the left-most icon on the 3D toolbar.

Every 3D figure has a default view, which can be returned to by selecting View 1 from the toolbar Views menu. Some figures may also have other interesting views available for you to try.

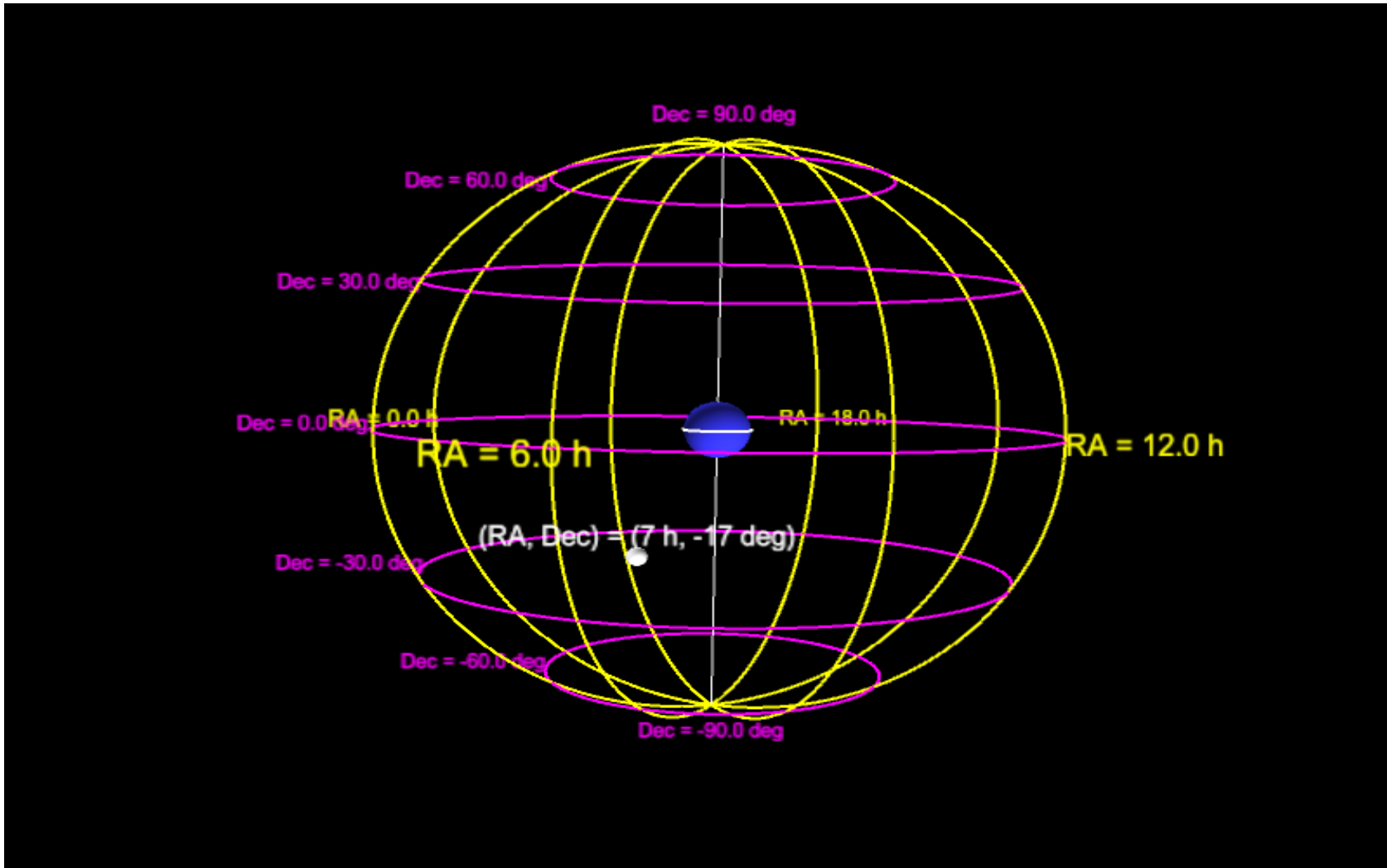
There are some additional keyboard shortcuts for you to use. (Note that you must first left mouse click on the 3D figure to utilise these shortcuts.)

arrow keys (up, down, left, right)	rotate the object
+ , -	zoom in or out
a	autospin
* , /	increase, decrease the autospin speed
[ , ]	roll the object clockwise, anti-clockwise
h	return to the default view

Some 3D figures may also allow you to show or hide certain types of objects from view. If available, this option will appear as a text link below the 3D figure, e.g. [Click here to...](#)

*Note:* The free Adobe Reader (Version 8 or higher) is required for these 3D PDFs.

## 2 The celestial sphere



### 3 Credits

The data for this PDF was sourced from CDS's SIMBAD Astronomical Database.

The 3D content in this PDF document was prepared with S2PLOT (Barnes et al., 2006, PASA, 23, 82; Barnes & Fluke, 2008, New Astronomy, 13, 599).

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