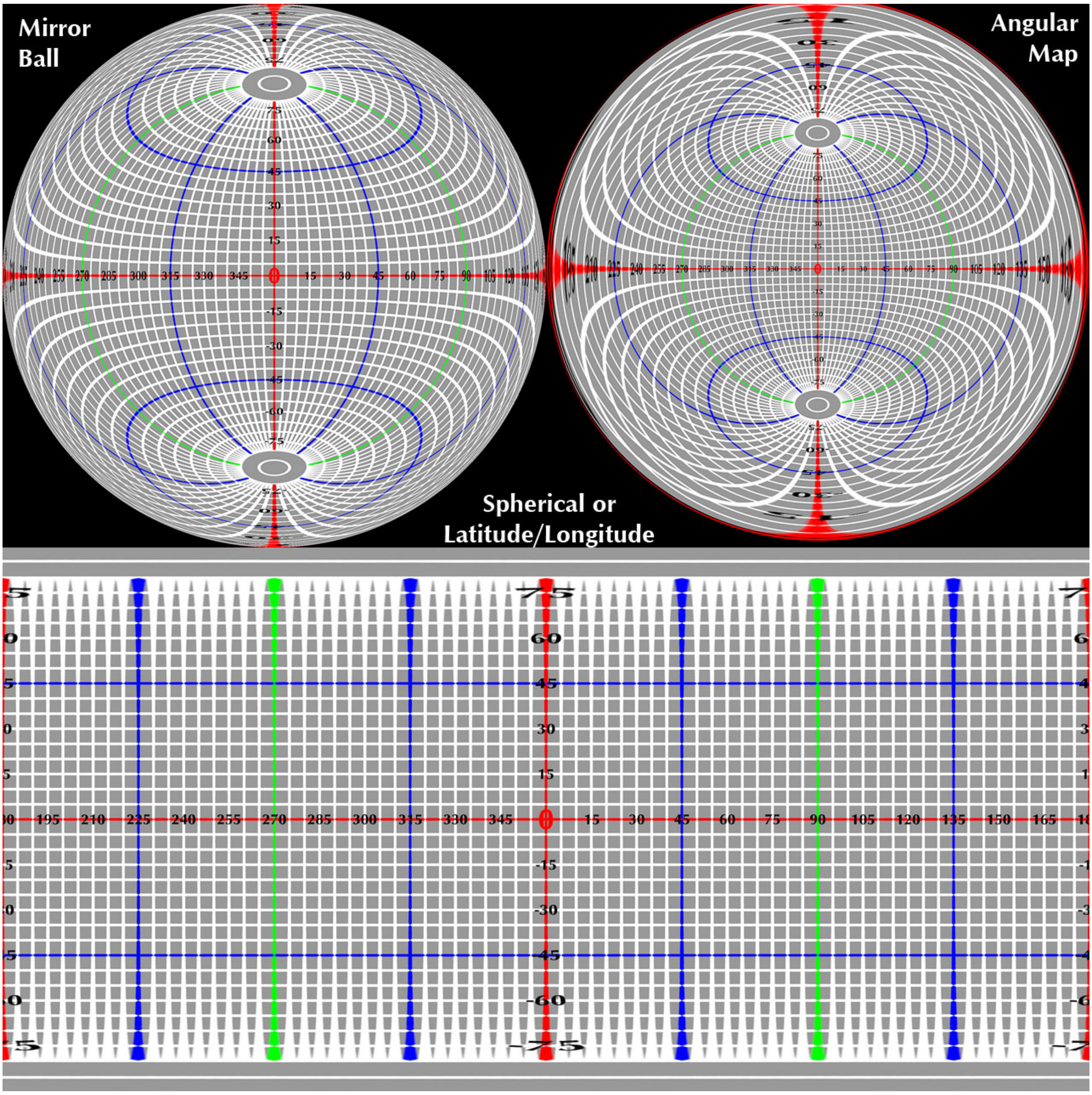
Mirror Ball, Angular Map and Spherical

There are different projections Bryce can use: Angular Map and Spherical.
The Angular Map is often confused with the Mirror Ball projection.

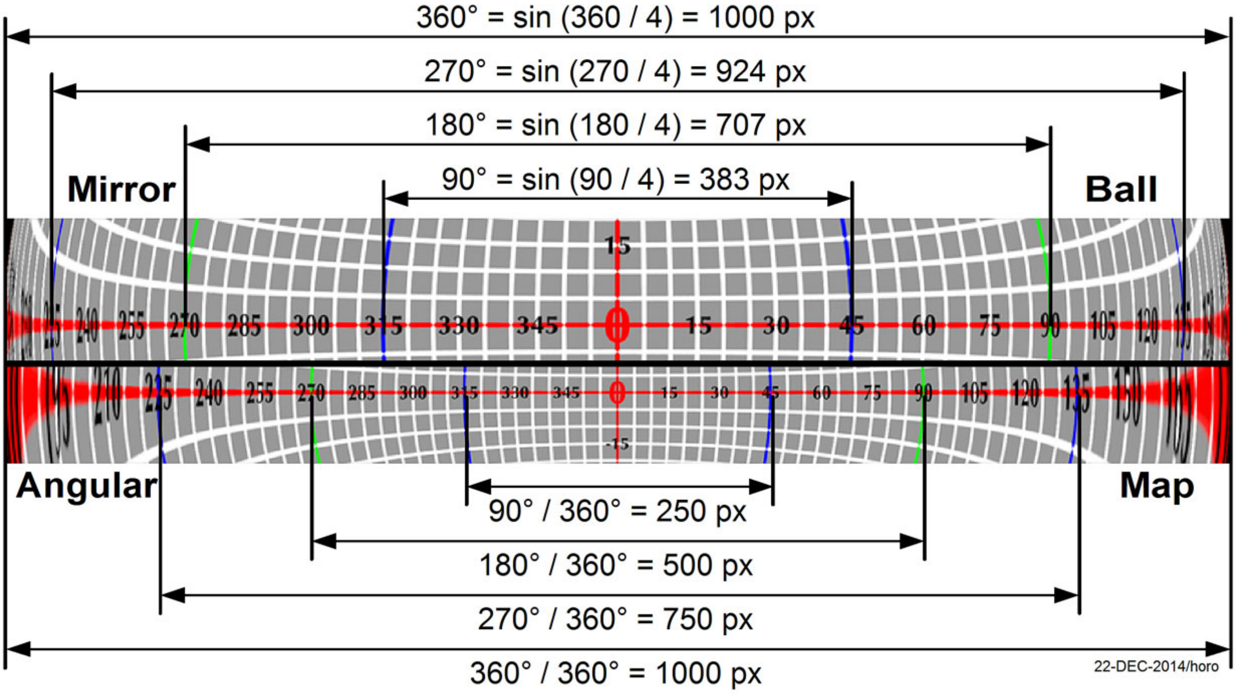
Mirror Ball

A mirror ball reflects the complete environment, except the part it covers. Therefore, an ideal mirror ball has a diameter of 0, which is impossible. The environment is not evenly mirrored on the sphere. There are almost ¾ of the surface mirroring what is in front of it, leaving only ¼ for the back side. Looking at it from this angle, an ideal mirror ball should have an infinite size. Obviously, a diameter of 0 and one of ∞ cannot be combined so there are compromises.



Three projections: top left Mirror Ball, top right Angular Map and below Spherical (Bryce render).

When looking along the equator of the mirror sphere the number of pixels per degree changes by the sine. The graphic below shows on the upper part the relationship. 90° are a fourth of the circumference. The front 90° get 38% of the surface, the back 90° less than 8%.



The equator of a Mirror Ball (above) and an Angular Map (below).

Angular Map

This projection assumes the observer in the centre of the sphere. The graphic above shows on the lower part the equator of a sphere in the angular map projection. Each of the four 90° sections gets exactly the same amount of space to depict the environment. The quality is therefore in every direction the same.

Admittedly, the mirror ball and angular map projections look similar at first glance but they are quite different, if they are shown next to each other like in the picture on the previous page. Note that the red 180° line is not visible in the mirror ball but on the perimeter of the angular map; and at the left and right edge of the spherical projection.

Spherical (also called **Latitude/Longitude** or **Equirectangular**)

This is a projection we know from a world map. Each part gets the same amount of space but towards the poles, the verticals get stretched. The poles are not a point but a line. A spherical panorama can be used for a cylindrical panorama up to latitudes ±45° without noticeable distortions and it may be even acceptable up to ±60° but afterwards the distortion gets annoyingly noticeable. That’s why Greenland is almost as large as the North American continent on a world map. However, if mapped on a sphere, everything looks perfect.

Bryce

Bryce can use HDRIs in the angular map and spherical projections, to map an LDRI on a sphere, only a spherical projected image can be used. It can render a cylindrical panorama.

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