

## What is the angle between the plane of Saturn's rings and its equatorial plane?

Saturn's primary ring system, consisting of the inner and outer rings visible to the telescope-aided eye, lies in the planet's equatorial plane.<sup>1</sup> Thus, the angle between the ring plane and the equatorial plane is approximately  $0^\circ$ .

As with Earth, however, Saturn's equatorial plane and orbital plane are not the same. Our own planet's equatorial plane is tilted  $23.5^\circ$  relative to the orbital plane (termed the *ecliptic*).<sup>2</sup> In the case of Saturn, this tilt is larger, at  $26.7^\circ$ .

Consequently, Saturn experiences different seasons in its northern and southern hemispheres, just as Earth does. Because the equator and rings of Saturn are coplanar, the ring plane is also tilted  $26.7^\circ$  relative to the orbital plane.

There is one exception: the Phoebe ring, the outermost ring identified to date, rotates in the ecliptic of Saturn, and is therefore tilted approximately  $26.7^\circ$  below the equatorial and ring planes.<sup>3</sup> The Phoebe ring rotates in a retrograde direction, i.e., the material in this ring rotates around Saturn in a direction opposite to that of the other rings.

### References

1. Miner, Ellis D., Randii R. Wessen, and Jeff Cuzzi. *Planetary Ring Systems*. Chichester: Praxis Publishing, 2007. Print. pp. 111-12.
2. Rohli, Robert V, and Anthony J. Vega. *Climatology*. Boston: Jones & Bartlett, 2007. Print. p. 30.
3. Comins, Neil F. *Discovering the Essential Universe*. New York: W. H. Freeman, 2006. Print. p. 180.