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Eclipse

An **eclipse** is a total or partial obscuration of one celestial body by another, the most dramatic being solar eclipses (*kusūf*) and lunar eclipses (*khusūf*). These were universally visible and attracted widespread attention as awe-inspiring celestial phenomena, often associated with important events and perceived as beneficent or maleficent omens. Beginning in antiquity, specialised observers noted variations in eclipse duration, changes in the apparent size of the Sun and Moon, the varying brightness of the planets, and colour changes (the eclipsed Moon ranges from white to deep red) (Goldstein; Montelle, 13–4; Steele, *Observations*, 3, 86).

A solar eclipse (*kusūf al-shams*) occurs when a new Moon, interposed between the Sun and Earth at conjunction, is so aligned that it blocks the light of the Sun for an observer on Earth. The Sun's western edge is occulted first and reappears first. A lunar eclipse (*kusūf al-qamar* or *al-khusūf* in technical literature) occurs when the Earth, interposed between the Sun and a full Moon (at opposition to the Sun), blocks the light of the Sun, and the

full Moon falls within the Earth's cone-shaped shadow. A lunar eclipse begins at the western edge of the shadow, and it is the Moon's eastern edge that is occulted and reappears first [Illustration 1].

Lunar and solar theory are intimately related. A lunar eclipse does not occur at every full Moon, because the Moon's orbit is inclined about five degrees to the ecliptic plane (defined in premodern astronomy as the Sun's yearly path about the Earth); the Moon thus usually misses falling into the Earth's shadow. A lunar eclipse is possible only if opposition occurs at a distance of less than twelve degrees from one of the two lunar nodes (*jawzahar*), the two opposite intersections (crossing points) of the Moon's orbit and the ecliptic. The northern crossing point is sometimes referred to as the "head" (*ra's*) and the southern as the "tail" (*dhanab*). Two lunar eclipses can be seen five months apart, most frequently six months apart, and never seven months apart (Naṣīr al-Dīn al-Ṭūsī, 1:150–1 [para. 7], 228–39, chap. 13). For details of the history and etymologies of *jawzahar*, which occurs in astronomical and astrological texts, see Hartner, *al-Djawzahar*.