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Saturn's egg-shaped E ring

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Saturn's diffuse E ring is unique in many ways. Not only its enormous size encompassing the icy moons Mimas, Enceladus, Tethys, Dione, Rhea and even Titan is remarkable, but also its unique property to be composed of narrowly size-distributed grains centered in the interval between 0.3 and 3 microns. Cassini measurements revealed that the ring is primarily fed by water ice grains emerging from the geologically active south pole region of the ring moon Enceladus.

Recent data acquired by the Cassini Cosmic Dust Analyser (CDA) revealed another unique property of this enigmatic ring: the morphology of the inner dense E ring shows a pronounced dependence on the local time. Towards the Sun (i.e noon) the radial density profile of the ring is compressed inwards, while at local midnight the radial density profile flares out. This implies that the E ring does not have circular, disk-like morphology but has an egg-shaped appearance. Also the particle size distribution seems to depend on the local time. Observations by the Cassini camera ISS are consistent with the CDA conclusion.