



Stochastic events lead to accretion in Saturn's rings

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UVIS occultations indicate accretion is triggered at the B ring edge, in strong density waves in ring A and in the F ring. Moons may trigger accretion by streamline crowding (Lewis & Stewart); which enhances collisions, leading to accretion; increasing random velocities; leading to more collisions and more accretion. Cassini occultations of these strongly perturbed locations show not only accretion but also disaggregation, with time scales of hours to weeks. The collisions may lead to temporary aggregations via stochastic events: collisions can compress unconsolidated objects, trigger adhesion or bring small pieces into contact with larger or higher-density seeds. Disaggregation then can follow from disruptive collisions or tidal shedding. In the accretion/disruption balance, increased random motions could eventually give the upper hand to disruption... just as 'irrational exuberance' can lead to financial panic in the economy; or the overpopulation of hares can lead to boom-and-bust in the population of foxes. This unstable equilibrium can similarly give rise to episodic cycles in accretion: explaining why the observable ring features that indicate embedded objects have been increasing since the beginning of Cassini's observations of Saturn in 2004.