

Thermal Stress acting on Saturn's ring particles and boulders on icy satellites.

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We investigate the thermal stress acting on icy particles of Saturn and boulders on icy satellites. As a result, we find that the stress induced by diurnal or seasonal temperature variation is sufficient to cause failure of icy rigid particles with 1 m to 1 km. In terms of size evolution of ring particles, the thermal stress would be key physical parameters. Also, this implies that the lifetime of icy boulders on satellites is quite short, which is consistent with the fact that boulders are visible on the geological active province of Enceladus but invisible on the other icy satellites. In the future mission, the existence of boulders on icy satellites such as Europa would imply its recent activity.

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