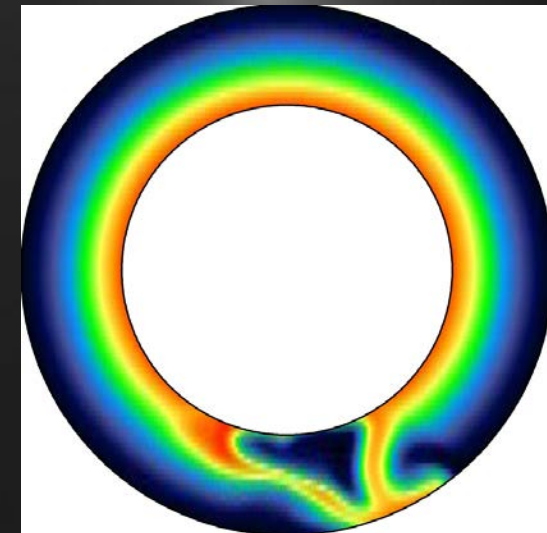


Core asymmetry promotes activity in Enceladus' southern hemisphere

New models of convection in Enceladus' ice shell provide a natural explanation for how the moon's heat flow localizes near the south pole.

- Enceladus is incredibly active for a cold, icy moon. Geysers, tectonic activity, and high heat flows emanate near its south pole, but are not seen anywhere else over the satellite. The localization to the south pole and the intensity of the heating are major unsolved puzzles.
- The tidal heating powering this activity should be symmetric across Enceladus' equator: heating near the south pole should be accompanied by heating near the north pole. Previous models of heat transport in the ice shell have been unable to explain the activity limited to the south pole.
- New global, three-dimensional convection models show that slight irregularities in the shape of the silicate core underlying the ice shell can break the symmetry and allow confinement of activity to near the south pole. The activity can also occur episodically, explaining how the current massive power output could occur given the limited overall tidal heating available to Enceladus.



Numerical model showing confinement of activity to south pole of Enceladus. Color shows ice temperature.