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## Neutron Star Mountain Creation]{Mountain formation by repeated, inhomogeneous crustal failure in a neutron star

*Friday, 9 July 2021 08:30 (20 minutes)*

The elastic crust of a neutron star fractures repeatedly as it spins down electromagnetically. An idealized, macroscopic model of inhomogeneous crustal failure is presented based on a cellular automaton with nearest neighbor tectonic interactions involving strain redistribution and dissipation.

Predictions are made of the size and waiting-time distributions of failure events, as well as the rate of failure as a function of time, as the star spins down. The last failure event typically occurs, when the star spins down to  $\approx (5 \pm 3)\%$  of its birth frequency, with implications for rotational glitch activity. Neutron stars are commonly suggested as sources of continuous gravitational waves. The output of the automaton is converted into predictions of the star's mass quadrupole moment and gravitational wave strain as functions of its age, with implications for future observations with instruments such as the Laser Interferometer Gravitational Wave Observatory (LIGO).

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