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**r-modes in Strange Stars with a Crystalline Crust**[1] PRASHANTH JAIKUMAR, California State University Long Beach — The r-mode instability, believed to limit the rotation speed of compact stars, can provide empirical confirmation for the existence of stable deconfined phases of quark matter that are predicted by weak coupling calculations in Quantum Chromodynamics. We construct a model for strange quark stars as heavy as 2 solar masses that are made of superconducting quark matter in the bulk and a thin crystalline quark matter crust. This crystalline quark crust is sufficiently robust to withstand r-mode heating and viscous rubbing for realistic mode amplitudes, unlike a crust made of neutron-rich nuclei. The dissipation provided by viscous rubbing at the core-crust boundary is barely sufficient to obtain stable rotation speeds that are consistent with the majority of rapidly spinning pulsars in low mass X-ray binaries suggesting additional unknown sources of damping. Our analysis implies that while bare strange stars are ruled out by the existence of rapidly spinning pulsars, a strange star with a crust is a distinct possibility.

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