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Proton decay amplitudes with physical chirally-symmetric quarks on a lattice

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Proton decays are sought as manifestation of baryon number violation predicted by Grand Unification. Their amplitudes depend on nonperturbative QCD, and we calculate them on a lattice with chirally symmetric quarks at the physical point for the first time. Our results largely agree with previous determinations done with heavy quark masses. Therefore, our findings solidify evidence against simple Grand-Unified theories as the absence of observed proton decays cannot be due to chiral QCD dynamics.

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