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**Scaling theory of the process zone of quasibrittle materials: an avalanche crossover analysis** JARON KENT-DOBIAS, Physics, Cornell University, ASHIVNI SHEKHAWAT, Materials Science and Engineering, Berkeley, JAMES SETHNA, Physics, Cornell University — We present progress towards a natural theory of the process zone surrounding cracks in quasibrittle materials using renormalization group methods. Quasibrittle or disordered brittle materials like concrete evade usual fracture analysis because of strong finite-size effects and a large disordered process zone. Unlike metals, where the process zone is relatively small and dominated by plasticity, microcracking relieves stress around the tip of quasibrittle cracks, a process that is not well understood. Recently, a scaling crossover theory was developed by Sethna and Shekhawat to explain the influence of finite size on the fracture mechanism and avalanche precursors. We extend this theory to model the scaling of stress and distribution of microcracking in the process zone.

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