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Plasmoid generation in resistive-MHD reconnection RAVI SAMTANEY[1], PPPL, NUNO LOUREIRO, IPFN, IST Lisbon, DMITRI UZDENSKY[2], Princeton University/CMSO, ALEXANDER SCHEKOCHIHIN, R.Peierls Centre for Theoretical Physics, University of Oxford, STEPHEN COWLEY, EURATOM/UKAEA Culham Science Centre — A detailed numerical study of resistive-MHD magnetic reconnection for very large, previously inaccessible, Lundquist numbers ($10^4 \leq S \leq 10^8$) is reported. Large-aspect-ratio Sweet-Parker current sheets are shown to be unstable to super-Alfvénically fast formation of plasmoid (magnetic-island) chains. The plasmoid number scales as $S^{3/8}$ and the linear growth rate of the instability as $S^{1/4}$, in agreement with the theory by Loureiro et al. [Phys. Plasmas **14**, 100703 (2007)]. In the nonlinear regime, plasmoids continue to grow faster than they are ejected and completely disrupt the reconnection layer. These results suggest that high-Lundquist-number reconnection is inherently time-dependent and thus call for a substantial revision of the standard Sweet-Parker quasi-stationary picture for $S > 10^4$.

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