

**Martin Goldstern, Lukas D. Klausner**  
*Stranger things about forcing without AC*

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**Abstract:** Typically, set theorists reason about forcing constructions in the context of Zermelo–Fraenkel set theory (ZFC). We show that without the axiom of choice (AC), several simple properties of forcing posets fail to hold, one of which answers Miller’s question from the work: Arnold W. Miller, *Long Borel hierarchies*, MLQ Math. Log. Q. **54** (2008), no. 3, 307–322.

**Keywords:** forcing; axiom of choice; non-AC forcing; ZF

**AMS Subject Classification:** 03E25, 03E40

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