

# **New stellarator configurations with precise quasisymmetry**

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Quasisymmetry is a property of some stellarator magnetic fields that can enable confinement of charged particles and plasma. Using improved optimization procedures, here we present several new stellarator configurations [1] that possess quasisymmetry throughout a volume to significantly higher precision than demonstrated previously. As a result, losses of fusion-produced alpha particles can be reduced below levels for previous stellarators, and neoclassical transport can be suppressed by orders of magnitude. In at least some cases, these levels of confinement can be achieved even with as few as 16 modular coils. Finally, a new method is presented for including the bootstrap current self-consistently in the optimizations.

[1] Landreman & Paul, Physical Review Letters 128, 035001 (2022)