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Mon-Af-Po1.19-04 [70]: Modelling and measurements of stator vs magnet width effects in high-Tc superconducting dynamos.

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High-Tc superconducting (HTS) dynamos are simple devices that provide an effective alternative to current leads for driving DC currents in superconducting coils. The simple geometry of these devices consists of some arrangement of superconducting stators and exciter magnets. With recent advances in our ability to model such systems, we investigate the relationship between width of the superconducting stator and the exciting magnet. This is of interest as previous studies have shown that a non-trivial optimum exists, as the extreme cases yield poor performance. With validation against experiment, we show that this optimum is caused by the trade-off between spatial field gradient and the total flux magnitude from the exciter magnet. Simulations also allow us to inspect the local flow of critical and over-critical currents in the stator that give rise to the relationships presented.

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