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## Calorimetric Measurements of AC losses in HTS coils and tapes in a Stator Environment

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Long HTS tapes have been fabricated in a variety of formats for the purpose of reducing the sensitivity to AC magnetic fields, from both conducted AC and external fields. Some of the conductors have been made more resistant to AC losses by HTS film composition and many others have been based on geometric arrangements of the conductors, such as different filament patterns in striated tapes, and helical twist shapes that do not exceed the minimum bend radius of the HTS films. Characterization by applying variable frequency AC and variable frequency strong magnetic fields, both synchronous and asynchronous, to samples of these conductors provides insight into their utility without the time and expense of building a complete motor or generator.

The measurements are taken using a modified previously reported calorimeter system that measures the total power losses in smaller high temperature superconducting coils or wire. The calorimeter measures self-field losses with the sample mounted in the stator environment of a generator/motor where a 0.6 Tesla alternating magnetic field is produced by an eight pole rotor designed to provide frequencies up to 400 Hz. The systems allow samples to carry direct or alternating current with the ability to concurrently expose them to a variable frequency alternating magnetic field. For this paper we will discuss differences in results from combination of synchronous and asynchronous losses on several conductor geometries.

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