

Abstract Submitted
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**High-throughput ML/AI methods to use multiple data-streams
from different diagnostics to characterize dynamic tokamak discharges¹**

MICHAEL MAUEL, JAMES ANDERSON, R.N. CHANDRA, J.P. LEVESQUE,
BOTING LI, A. SAPERSTEIN, I.G. STEWART, Y. WEI, G.A. NAVRATIL,
Columbia Univ — Modern magnetic fusion research involves high-resolution temporal and spatial diagnostics from multiple sensor arrays and provides opportunities to apply modern fusion-specific numerical linear algebra methods (*i*) to identify and optimize data reduction methods for real-time discharge control and (*ii*) to advance our understanding of fundamental behaviors of magnetically-confined plasma. This presentation uses measurements from recently expanded diagnostics on Columbia University’s High Beta Tokamak-Extended Pulse (HBT-EP) that capture complex behaviors and records high-resolution, high-speed streams of magnetic, soft-x-ray, current, and optical data. The results of numerical analyses of these data streams from HBT-EP are examined, as well as how statistical methods such as the time-domain singular value decomposition and novel applications of methods from the field of “randomized numerical linear algebra” (rNLA) can be applied to fusion diagnostic data.

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Michael Mauel
Columbia Univ

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