Recurrent neural network-based digital twin of ST40 tokamak dynamics: building system insight into model architecture

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Motivations

- A digital twin for plasma dynamics in a tokamak is useful

- Accurate & fast physics-based modelling is challenging

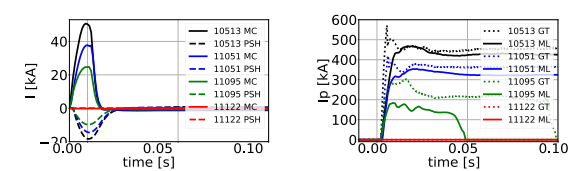- Hence, leverage Machine Learning (ML)-based approaches

Results

- A composite, hybrid ML/Physics Digital Twin developed

- It exhibits physically correct behaviour and dynamics

Challenges

- Sensors perturbed or damaged in experimental campaign

- Hence sensor response evolves; corrupts ML training data

Merging-compression startup

Plasma dynamics, vertical displacement events, disruptions