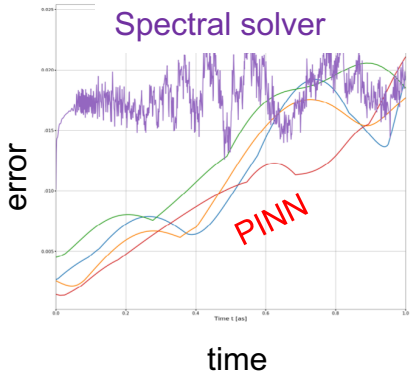
# ML-driven Modelling & Simulation

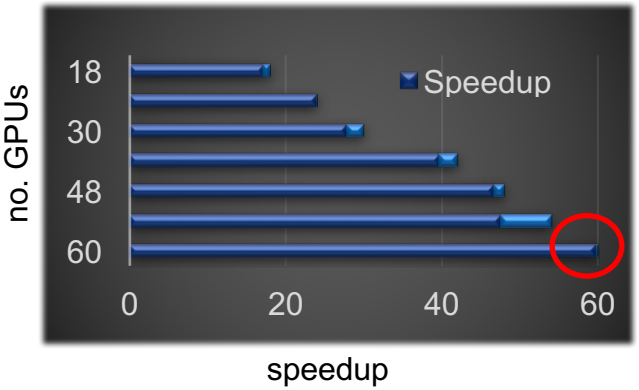
## Surrogate Modelling in Laser-Wakefield Acceleration

Assist large-scale experiments by Physics-informed surrogate models:

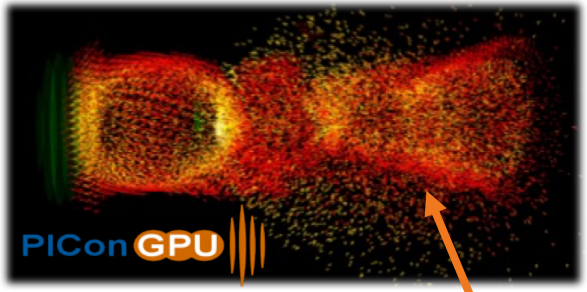
1. **Learn to simulate** state of a system
2. **Identify** state by adapting surrogate model to experimental data

➢ **Fast comprehension** of experiments

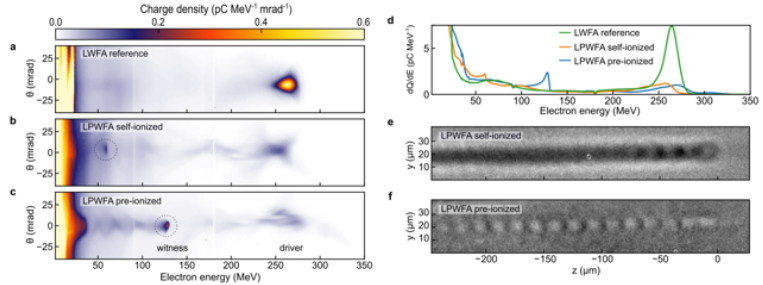



Theory




Experiment



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Tasks

1. Development of **surrogate models** for LWFA/PWFA simulations
   - fast grid scans
   - visualize relationships among parameters + initial conditions driving the simulation
   - Can we generalize our PDE learning methods to other data, too?
2. **Identification** of experimental data **based on pretrained surrogate models**
   - Identify parameters of system by fine-tuning surrogate model to experimental quantities