Gysela: 5D gyrocinetic code

- Data: 5D regular mesh with 3D coords + 2D velocities
  - Medium resolution: 1024x1024x64 x 128x 64
  - Fields
    - 5D (Vlasov equation):
      - Ions
      - Electrons
      - Impurities
    - 3D (Poisson equation)

The amount of compute hours needed for one run and the amount of data generated is a major challenge.

AI use-cases: Gysela

- Anomaly detection
  - to stop the simulation early
  - Small case that would still show anomalies: 128x265x32x16x8
  - Anomaly detection can likely be done independently per process
- Deep surrogate (full or partial) of Gysela:
  - Physics informed NN (pure or augmented with simulation data)
- **Compression:**

    Incremental iPCA

  - Prototypes on the way (WP3, WP2)
  - Discussion on how to learn the model
    - Can we use a number of early timesteps ?
    - Can the model be trained on existing runs ? data access ? or make smaller runs ?
  - For the movement Tokam2D probably enough for testing if iPCA is relevant