ML4Science

First Meeting - Week 1

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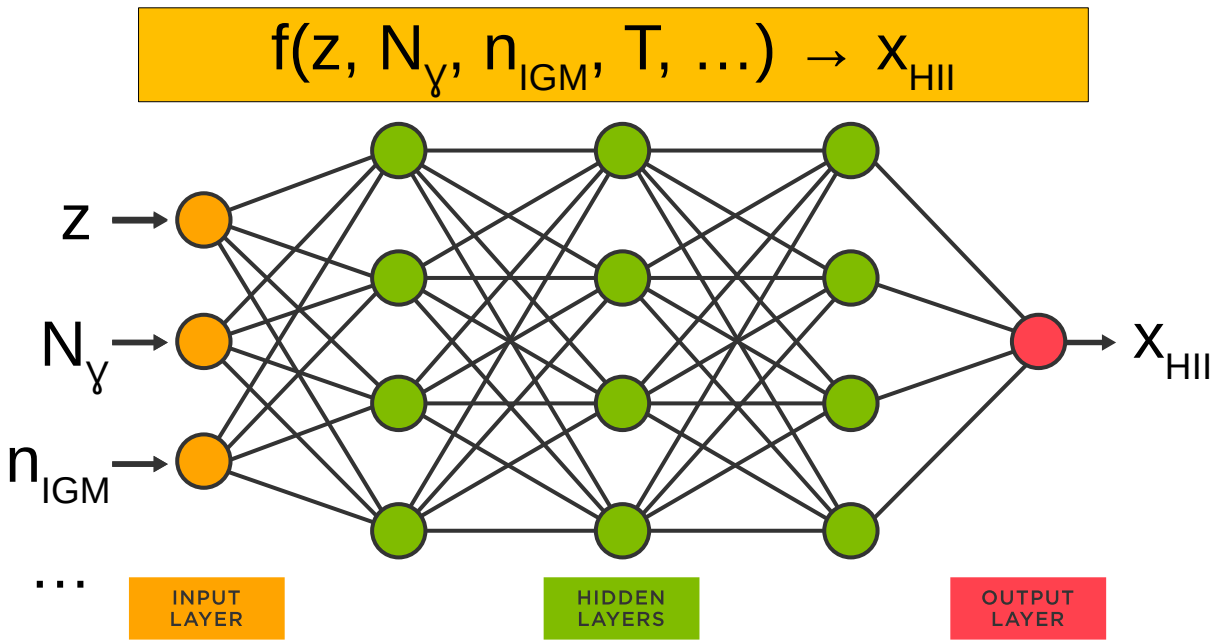
Today Meeting

- Quick overview of the project goal
  - Review from previous meeting
  - Review of the proposed network and analysis
- General information on the future meetings
  - Organisation of the meetings
  - Request access to EPFL cluster
- Overview of the data and python test script
  - Walk trough python script to access the data
  - Example script for PINN
- Discussion & hands-on

The ML4Science Project

Train PINN for the cosmic epoch of reionization:

- Implement the Hydrogen ODE in a FCNN for EoR simulations



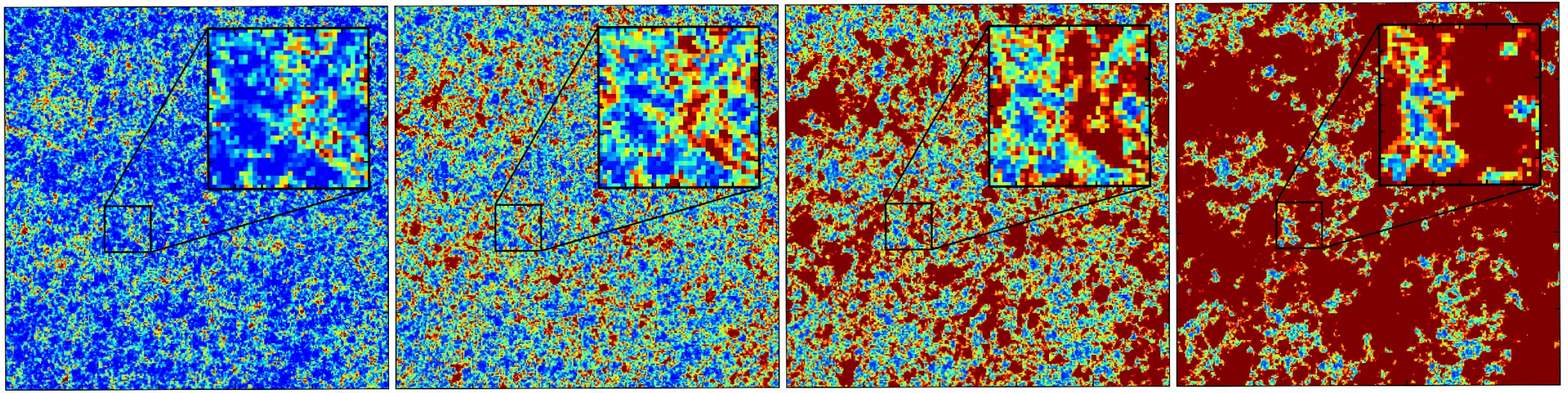
Differential equation for HII fraction

Chemistry equation employed in Epoch of Reionization simulation.

$$\frac{\mathrm{d}x}{\mathrm{d}t} = (1-x)(\Gamma + n_{\mathrm{e}} C_H) - x n_{\mathrm{e}} \alpha_H$$

Photo-ionization *Collisional ionization* *Recombination*

t_i t_{i+1} t_{i+2} ... t_{reion}



ML4Science Guidelines

Group of 3 students need to: ML4Science guidalines

- Written report: max 4 pages (example ML4Science 2021)
- Code: in Tensorflow / Keras or Pytorch
  - Results reproducibility
  - External libraries citations

The hosting lab

- Grading the domain-specific merit of your contribution
- Provide support to the lab project

Weekly Meeting

The organisation of the future meetings: 6 weeks 1 + 3 + 1 + 1

- Week 1: **(16 Nov)**
  Intro and first data analysis
- Week 2-4: **(23, 30 Nov and 7 Dec)**
  Weekly updates presented by one student
- Week 5: **(14 Dec)**
  Finalise the results start writing the report
- Week 6: **(18 Dec)**
  Finalise the report (plots, text, review report, etc.)

For this Week

- Set up a GitHub page (example ML4Science 2021)
  - Create a folder “Weekly Meetings” and store the student and host supervisor presentations
  - Git push your scripts with instructions
- Request access to EPFL cluster (link)
- Script for reading the dataset

A quick look at what we will do next week:

- a look at Fully-Connected Neural Networks FNN, (tutorial)