

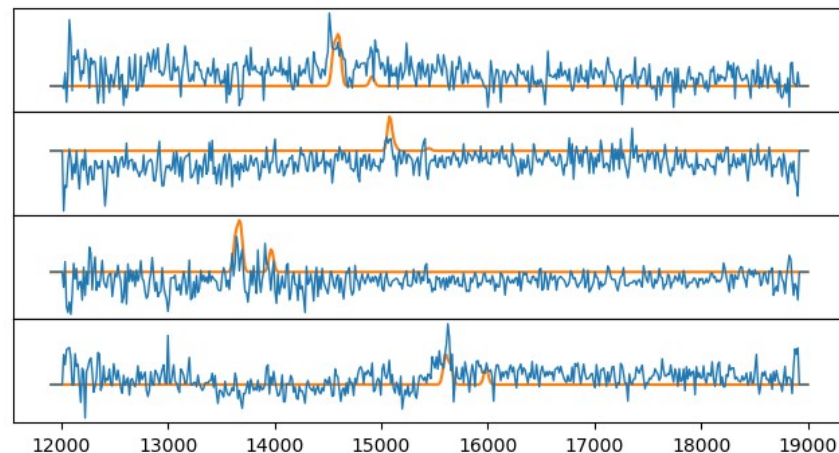
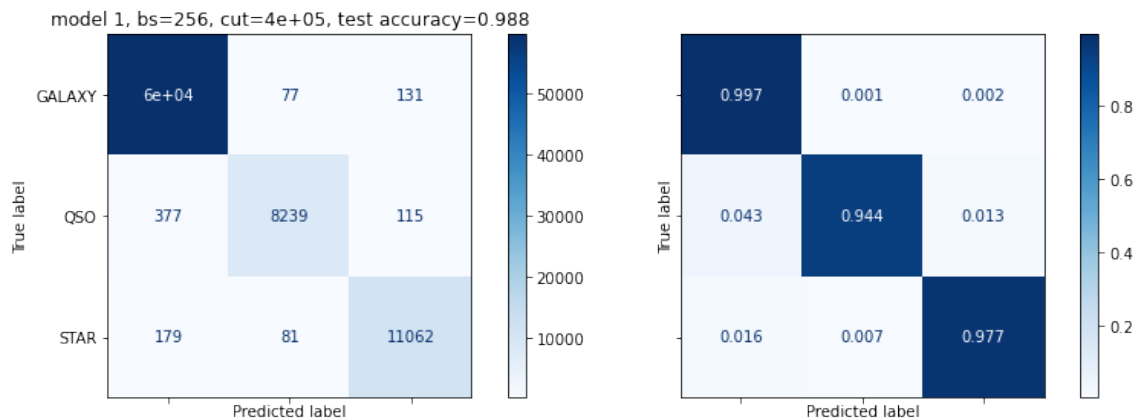
# A Brief Overview of ML/DL in Astrophysics

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Prospectives IP2I - FCC

# ML/DL at LAM

- CNNs to classify Galaxies / Stars / QSOs spectra (SDSS, 800'000)
- Experiments with spectra to classify good/bad redshifts
- ML classifiers to identify good/bad redshifts with photometry/spectroscopy descriptors



# CNNs widely used

- With images:
  - Photometric redshifts (ANR DEEPDIP)
  - Deblending/segmentation of galaxies
  - Flagging cosmic rays (Cosmic-CoNN) or contaminants (MaxiMask)
- With 1D data (spectra, light curves)
  - Quasars identification and redshift estimation (QuasarNet, FNet)
  - Finding transits in exoplanet light curves
  - Supernova Classification (SCONE)
  - Neural spectrum encoder and decoder (Spender)

# And not only CNNs

- Classical Machine Learning, e.g. classifiers (SVM, Random Forests) with photometry
- ML/DL papers in cosmology:  
<https://github.com/georgestein/ml-in-cosmology>
- Generative Models: Variational Auto-Encoders, GANs, etc. (Galaxy Image Simulations, <https://arxiv.org/abs/2008.03833> )
- Bayesian Deep Learning

# Conferences

- ML-IAP (Nov 27-Dec 1st 2023), <https://indico.iap.fr/event/1/>
- BDL, Bayesian Deep Learning for Cosmology and Time Domain Astrophysics, <https://astrodeep.net/workshop2022/>
- LISA Data Analysis: from classical methods to machine learning, <https://indico.in2p3.fr/event/27706/>
- Summer schools (AstroInformatique, <https://astroinfo2023.sciencesconf.org/>)