Towards a national laboratory for spectroscopy

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Why do we need a national Laboratory for spectroscopy?

Current and future MOS spectrographs will dedicate-most of the available time to surveys with more than 10^6 targets

Survey planning starts years before observations
Complex tools to define the surveys strategy and the target selection
Data reduction and analysis with automatic software
Large and complex database to collect data and results
New cutting-edge technologies (i.e. Artificial intelligence) required for analysis and interpretation of the data

Large coordinated teams distributed over several institutes composed of astronomers, physicists, statisticians, computer scientists

A look abroad: the British approach

Wide Field Astronomy Unit (ROE)

Primary science archive of several surveys
Development of tools for visualization, processing and archiving

Cambridge Astronomical Suvery Unit (IoA)

Data reduction pipeline for several instruments (WEAVE, 4MOST)
Data processing for several surveys

Oxford Hinze Centre for Astrophysical Surveys (Oxford)

Augmenting the participation to main future and current surveys

Leading role in main photometric and spectroscopic surveys

Spectroscopic survey at INAF

INAF researchers affiliated to different institutes (~10) involved in almost all the main projects (both Galactic and extragalactic) often with leading roles

Wide range of technical expertise (e.g., data reduction, databases, astroinformatics) distributed over different institutes

Coordinate different activities to optimize the INAF resources and further enhance the role of the institute on future spectroscopic surveys

Goals of the Laboratory

- ✓ Collecting in a single repository existing tools (scientific database, data reduction and analysis pipeline, data visualization tools, libraries of spectra, models, tools for planning and handling large surveys);
- ✓ Stimulating the research on the use of new technologies (e.g. machine learning) for spectral data analysis and data mining;
- ✓ Providing support for the participation of INAF scientists to the calls/opportunities for multi-object spectroscopic surveys;
- ✓ Providing an opportunity to enhance the “visibility” of young INAF scientists

Plan of actions

Community Networking

Dedicated workshops
Creation of Wiki and Website
Census of available skills and tools

Repositories/databases

Repository for existing tools for data analysis/reduction
Database for libraries of models/spectra
Scientific database for spectroscopic surveys

Development of modern tools/pipelines

Identifications of specific tools to support current and future projects
Stimulating new collaborations
Development of new tools

Frequently asked questions (answers within this meeting)

- What are the boundaries of the lab?
- What is the role of the laboratory in main the existing surveys (MOONS and WEAVE)?
- What is the role of the laboratory for planning future surveys?
- How will it be funded?

Thank you very much for participating with such a short notice

and

special thanks to the Director of the OAR for hosting us and to all the staff for the crucial help to organize a workshop in no time