ARTEMIX

ALMA REMOTE MINING EXPERMIMENT

Artemix is an ALMA data mining experiment. Supported by the LERMA and the Paris Observatory. Its aim is to provide astronomers with a remote quick look access to the ALMA scientific Archive content (FITS files) and to test pilot methods for remote 3D visualisation. A standalone version of the remote viewer YAFITS is now available.

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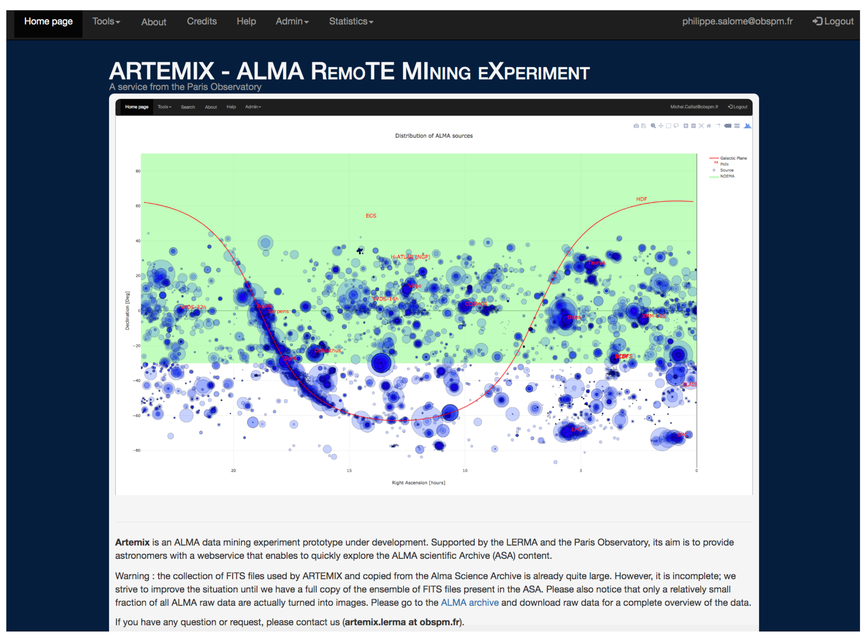

Keywords : NodeJS; MongoDB; Bottle; Dask; Astropy; OpenLayers; Plotly; Docker

Interoperabilty and credits : SAMP, Aladin, Cassis, VAMDC (JPL and CDMS), Sesame (CDS, NED)

Context

(i) To stand just beyond what is provided by the ALMA Observatory Science Archive (not delivering data, not providing material for data reduction). —> Redirection to the ALMA Science Archive

(ii) To use public meta-data and public fits data cubes

(iii) Not to redo what already exist in the ASA (ie rapid metadata query by multi-filters)

—> To Provide **a pilot study** of **remotely** operated tools for **quick look** visualisations

—> Developed at the Paris Observatory, LERMA, in the framework of the French AA-ANO3 duties coordinated by the OASU (OASU, Obs. Paris, OSUG, IRAM), included in PADC (Paris Astro Data Center)

Goals

(i) Search by products and display molecular lines

(ii) Provide trans-project queries (ie famous sources)

(iii) Have a rapid idea of the data content (fits files)

Means

(i) ALMA observing configuration previews (meta-data)

(ii) ALMA cube previews (science products QA2)

1. Service on-line **http://artemix.obspm.fr** —> Remote Quick-Look access to science data products since 2016
2. Access to **molecular databases** via VAMDC. Overlay expected line frequencies (independant pilot study, now implemented in the new ALMA Archive interface)
3. New features : **Faster viewer** based on Open Layers, **interoperability** via SAMP for spectra AND images.

Proof of Concept done but local FITS-archive not a full mirror (some data missing).

A **Standalone version of the viewer : Yafits.** Inside a **Docker** : simplified the installation procedure.

Region of Interest

—> Display the **frequency range observed** (basebands) for all the projects that correspond to a given region of interest. Overlay the molecules observed **(spectral lines from JPL / CDMS via VAMDC + Filters)**

—> Display the region of interest into **AladinLite** (help getting velocity / redshift if searched by sesame-name)

—> Display a **table of the header keywords** for all fits files that correspond to this region of interest (different Project codes, different FoV…)

—> Display a **table with all the metadata** for these projects (resolution, t_obs..)

Goal : quick visual inspection of what has been observed .vs. what has been imaged. Provide a link to the data cube (or 2D if in yellow)

—> On click in the table : overlay the frequency slice that has been imaged (**metadata vs fits header**), overlay the FoV (fits header box)

—> Link to **ADS** for publication check

—> Link to **ESO/NRAO ALMA archive** for data retrieval

Quick Look Viewer (YAFITS)

—> **Display the data cube** (2 images, 2 spectra) : pixel-based quantities and averaged quantities: Image of a channel, Spectrum of a pixel, Image of a range of channels, Spectrum of an area of pixels. Interactive and coupled (clic, pan, zoom)

—> Based on **GILDAS Mapping « go view »**. Same functionalities implemented (frequency selection, region selection, integrated flux computation)

—> Link to the detailed fits header

—> **New viewer implementation (faster)** based on Open Layers

—> **Interoperabilty** to export **spectra** and **images** via **SAMP, i**e into Aladin / CASSIS and **VO-complient** viewers**.**

A more versatile and **standalone version YAFITS** has been produced. As for now, compatible with ALMA, NOEMA, SITELLE and MUSE datacube. Easy run via a **Docker** image.