DIVISION OF
ACADEMIC AFFAIRS
EDWARD ST. JOHN LEARNING & TEACHING CENTER

Applications

Pierre Le Sidaner – Adrian Damian

Applications deal with :

Standards : Samp (1.3), VOTable (1.5), MOC (2.0), HIPS (1.0)

Implementations using VO Standards : Portals, VO Clients, software libraries ...

Program of this interop : 2 dedicated sessions, 1 shared session with Time Domain :

- **Software Libraries : PyVAMDC, PyVO updates**
- **Standad evolution : HIPS 3D, HIPS Mixer**
- **Evolution (notes) : Parquet, 2 X HATS**
- **VOTable : Mango/Mivot, Unicode,**
- **Others : extreme precision radial velocity**

Applications Session 1: June 3, 2025 - 14:00-15:30	
Speaker	**Title**
Carlo Maria Zwölf	**pyVAMDC a new library to access atomic and molecular data** During this talk we will present pyVAMDC, a new Python library to extract, in an interoperable way, data from the main databases providing atomic and molecular data for astronomy and astrophysics.We will show the key concept behind this library (architectural choices) and will explain, through working example, how users may adopt it.
Mark Taylor	**VOParquet Note and implementations** The VOParquet convention that describes associating rich VOTable metadata with bulk data in Parquet format was published as an IVOA Note in January 2025. I will briefly recap the content of this Note, and report current implementations of it, as well as some utility tools available in STILTS for validating, debugging and tuning files written using the VOParquet convention.
Pierre Fernique	**HiPS3D: Proposal to extend the IVOA HiPS standard to cubic data** The HiPS - 'Hierarchical Progressive Survey' - method was standardized by IVOA in 2017. Based on a regular hierarchical division of the sky, it provides an effective solution to the problem of visualizing and even manipulating large-scale surveys. With the growing use of observing equipment generating cubic data, such as SKA or Rubin, the HiPS standard needs to evolve to better address this additional dimension, in terms of both frequency and time. We will present the CDS work on this subject, based on results obtained on a prototype version of Hipsgen - a HiPS generator - and Aladin Desktop - a HiPS client/viewer. We will describe the evolutions that might be necessary to the HiPS standard in order to generalize it to cubic observations.
Neven Caplar	**HATS IVOA Note** We present the Hierarchical Adaptive Tiling Scheme (HATS), a spatial indexing framework developed to enable efficient querying and cross-matching across massive astronomical datasets. HATS adapts to non-uniform sky coverage and data density, providing a scalable and flexible structure for modern survey data. In this talk, we will outline the structure of the HATS IVOA Note, discuss current implementations, and invite feedback on community adoption.
Francois-Xavier Pineau	**On-the-fly HATS using QATSS** We are going to provide a feedback on implementing on-the-fly streamed HATS products from HEALPix sorted and indexed data, and discuss both the advantages and limits of such an solution.

Applications Session 2: June 5, 2025 - 11:00-12:30	
Speaker	**Title**
Laurent Michel	**Mango/Mivot tooling** I'll present the state of the art with the tools I'm developing to handle the mapping of VOTable data on data models (especially MANGO) with Mivot. This includes the Pyvo annotation reader and writer, the model validator, and a few other things.
Markus Demleitner	**The State of Unicode in VOTable** VOTable has had basic unicode support from day one; there is the unicodeChar datatype – which would work just fine if there was only TABLEDATA. Alas, in BINARY serialisation, unicodeChar is supposed to do UCS-2, which has been obsolete since at least 2011 and is hardly implemented anywhere anymore (if you think you have UCS-2, you probably have UTF-16). On the other hand, we now live in a world of UTF-8, and 8-bit encodings are a thing of the past. Perhaps it is time to allow UTF-8 in char and deprecate unicodeChar?
Bruce Berriman	**Extreme Precision Radial Velocities and IVOA Standards** Extreme Precision Radial Velocity (EPRV) refers to radial velocity measurements that aim to realize a precision of better than 0.1 m/s, with the ultimate goal of detecting temperate, Earth-like exoplanets orbiting nearby Sun-like stars. An international working group is developing standardized formats for EPRV data products delivered by modern instruments. This group desires to make the data formats compatible with IVOA and FAIR standards, to support wide discoverability and accessibility to these data and to enable interoperability with related datasets. This presentation describes progress in these standardized formats and discusses areas where IVOA standards enable them to be discoverable and accessible.
Brigitta Sipőcz	**PyVO Update** Current 1.6.2 release and future plans.
Thomas Boch	**HiPS mixer** I will present HiPS Mixer, a new service that allows users to dynamically create virtual HiPS datasets by combining existing ones. This enables various use cases, such as extending the sky coverage of existing HiPS or generating new color HiPS from three or more individual filter-based HiPS. The resulting HiPS are fully compliant with the standard and can be used seamlessly in any HiPS-compatible client. This development also opens the door to distributed HiPS, with servers at different locations publishing distinct regions of the sky.

Applications Session Joint with Time Domain: June 5, 2025 - 14:00-15:30	
Speaker	**Title**
Astrid Lamberts	**Data format needs for LISA** LISA will detect a range for gravitational wave sources, both transient and persistent. While the first prototypes for the data processing are being developed, we are starting to imagine the format for this new type of data so that it can be used by a wide range of astronomers.
Leo P. Singer	**What to do about huge LIGO/Virgo sky maps** ...
Francois-Xavier Pineau	**Multi-Order HEALPix Map implementation in CDS HEALPix Rust** Multi-Order HEALPix Maps (MOMs) are kind of MOCs in which a value is associated to each cell. It's also an extension of BMOCs to non-boolean values. An example of application is (chi2) compressed density maps. After an introduction and examples, we are going to present the choices made in the Rust implementation, and how MOC, BMOC and MOM serializations could be unified (also for Time and Frequency), and operations performed from streamed inputs, thanks to the ZUNIQ numbering.