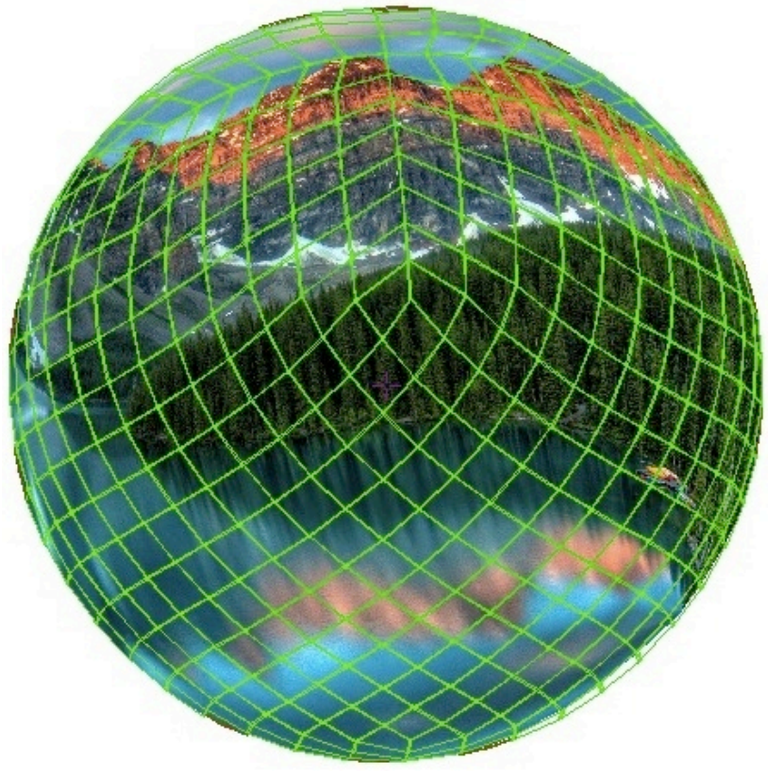
Interactive data exploration through on-the-fly generation of HiPS tiles

Thomas Boch, François-Xavier Pineau



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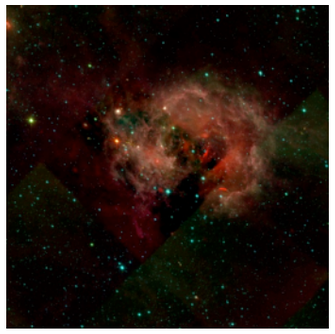
A few words on HiPS

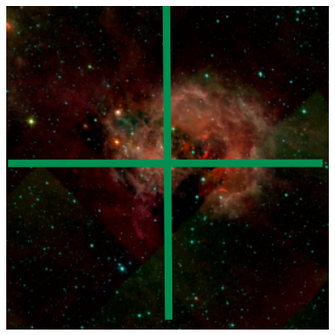
- HiPS: **Hi**erarchical **P**rogressive **S**urveys
- Hierarchical tiling mechanism to browse seamlessly image, catalogue and cube data
  - HEALpix-based tessellation
- HiPS clients: Aladin desktop, Aladin Lite, Mizar
- *hipsgen*: tool to generate HiPS from a set of images/cubes/catalogue
  Tiles **generated once** and served **statically**
- More info, documentation & tools on
  http://aladin.u-strasbg.fr/hips/

HiPS pyramid



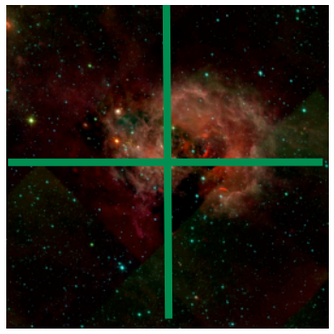
Level 4

HiPS pyramid



Level 4

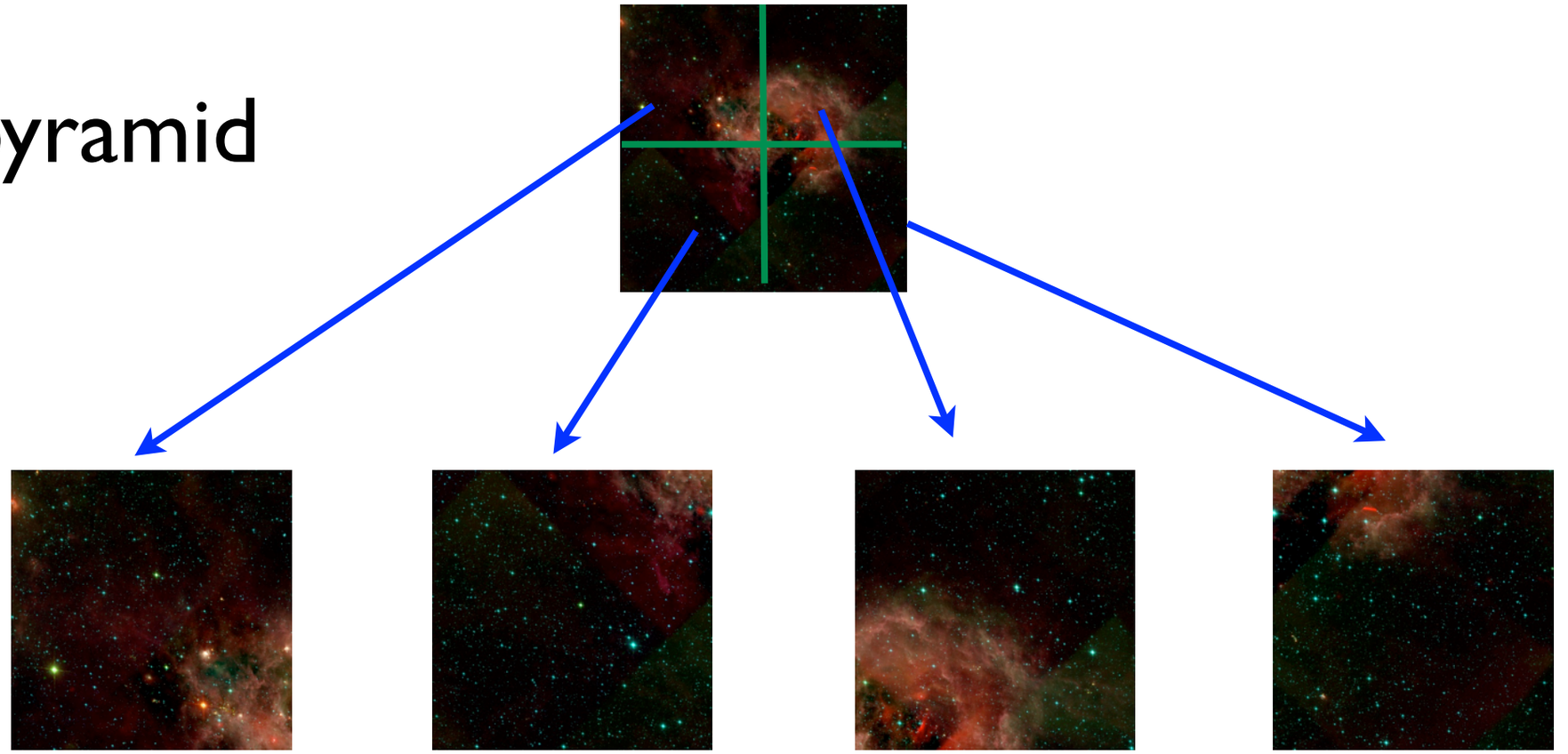
HiPS pyramid



Level 4

Level 5

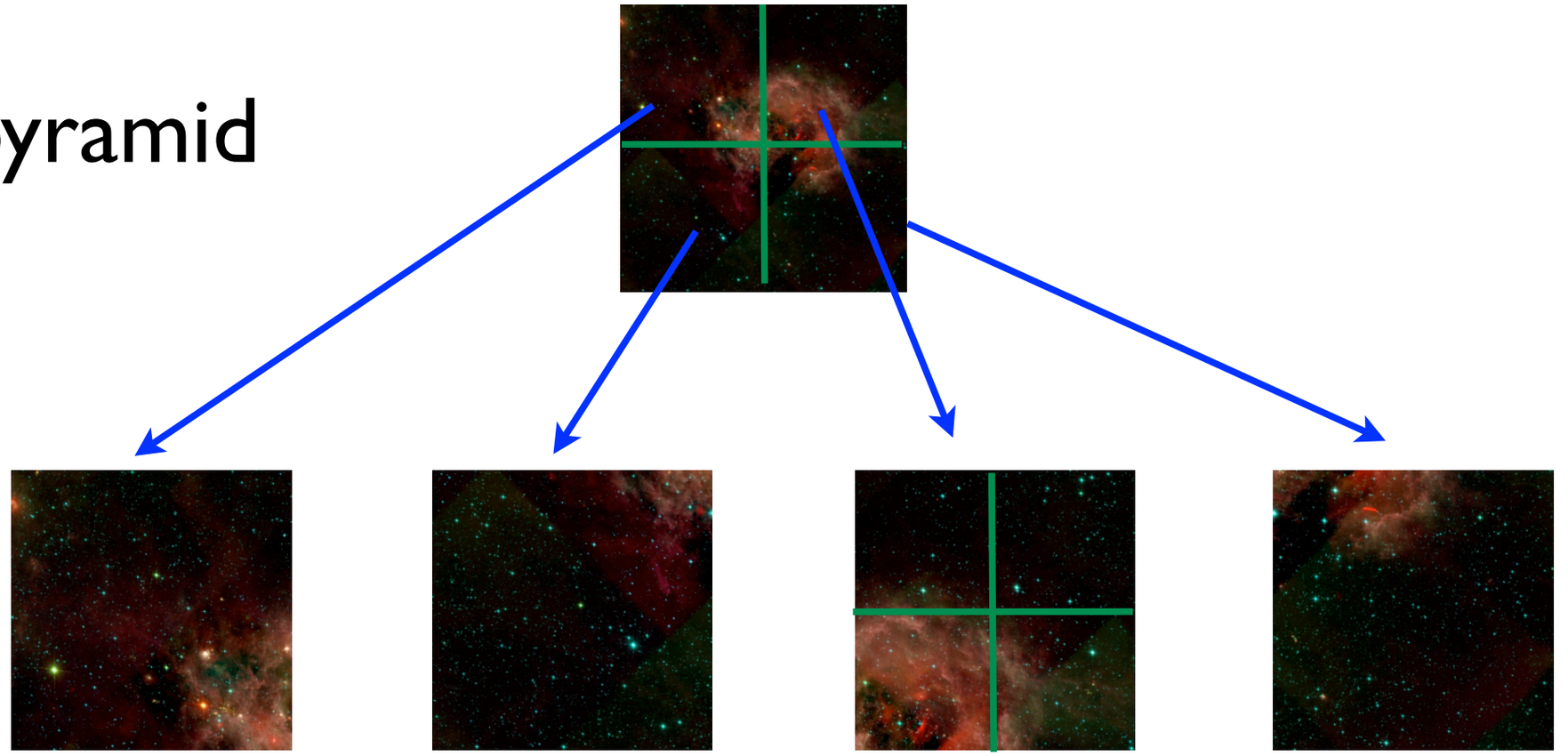
HiPS pyramid



Level 4

Level 5

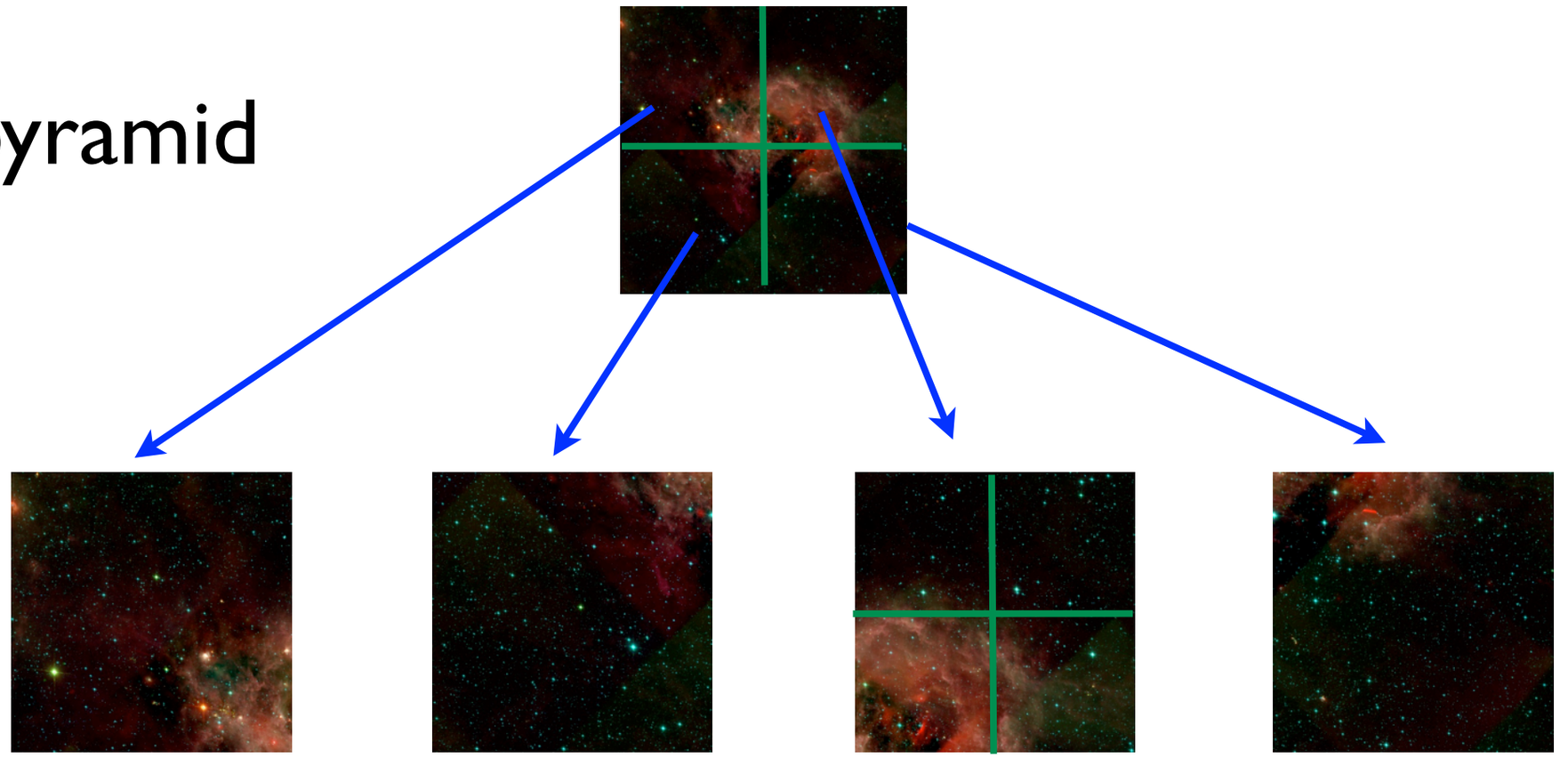
HiPS pyramid



Level 4

Level 5

HiPS pyramid

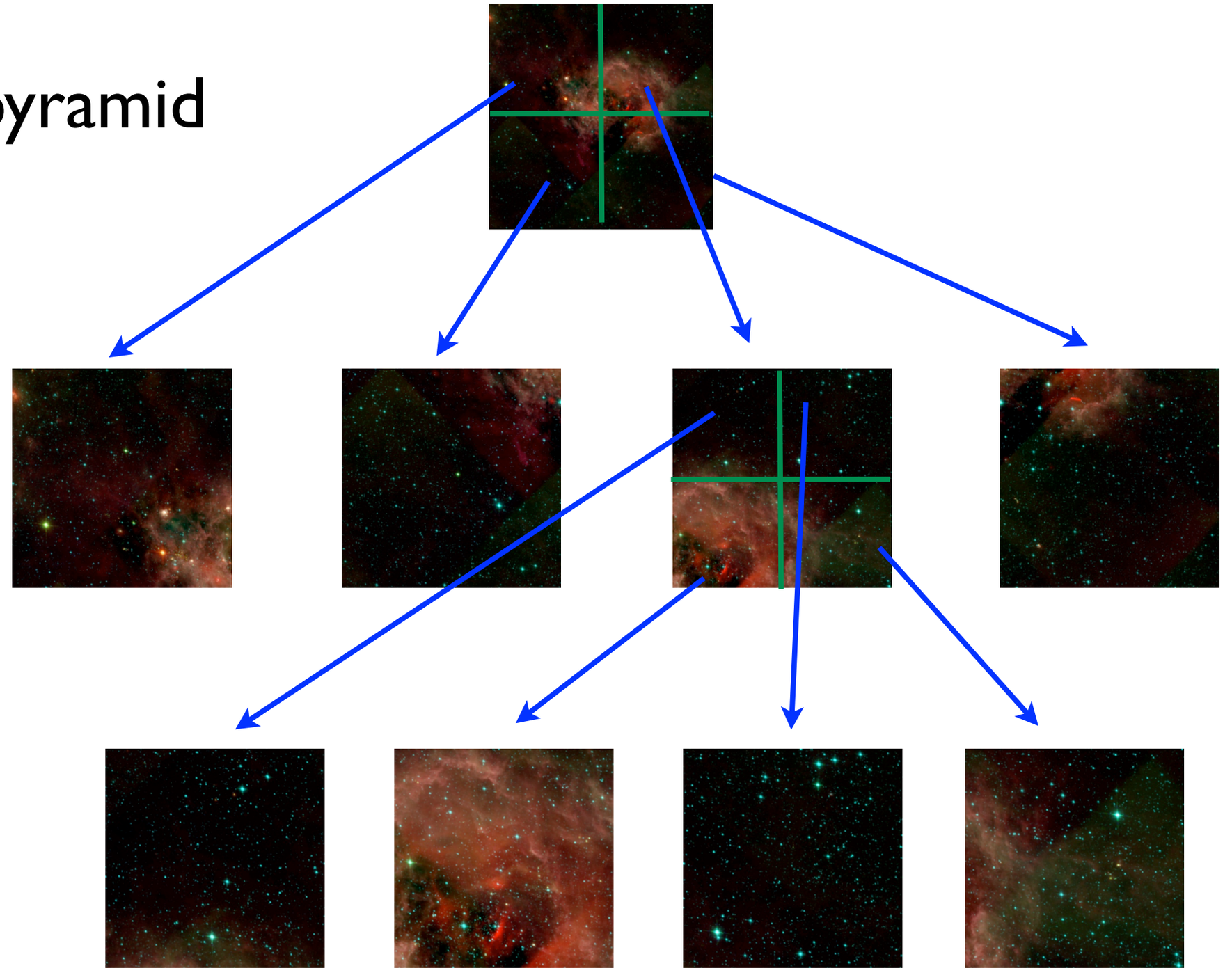


Level 4

Level 5

Level 6

HiPS pyramid



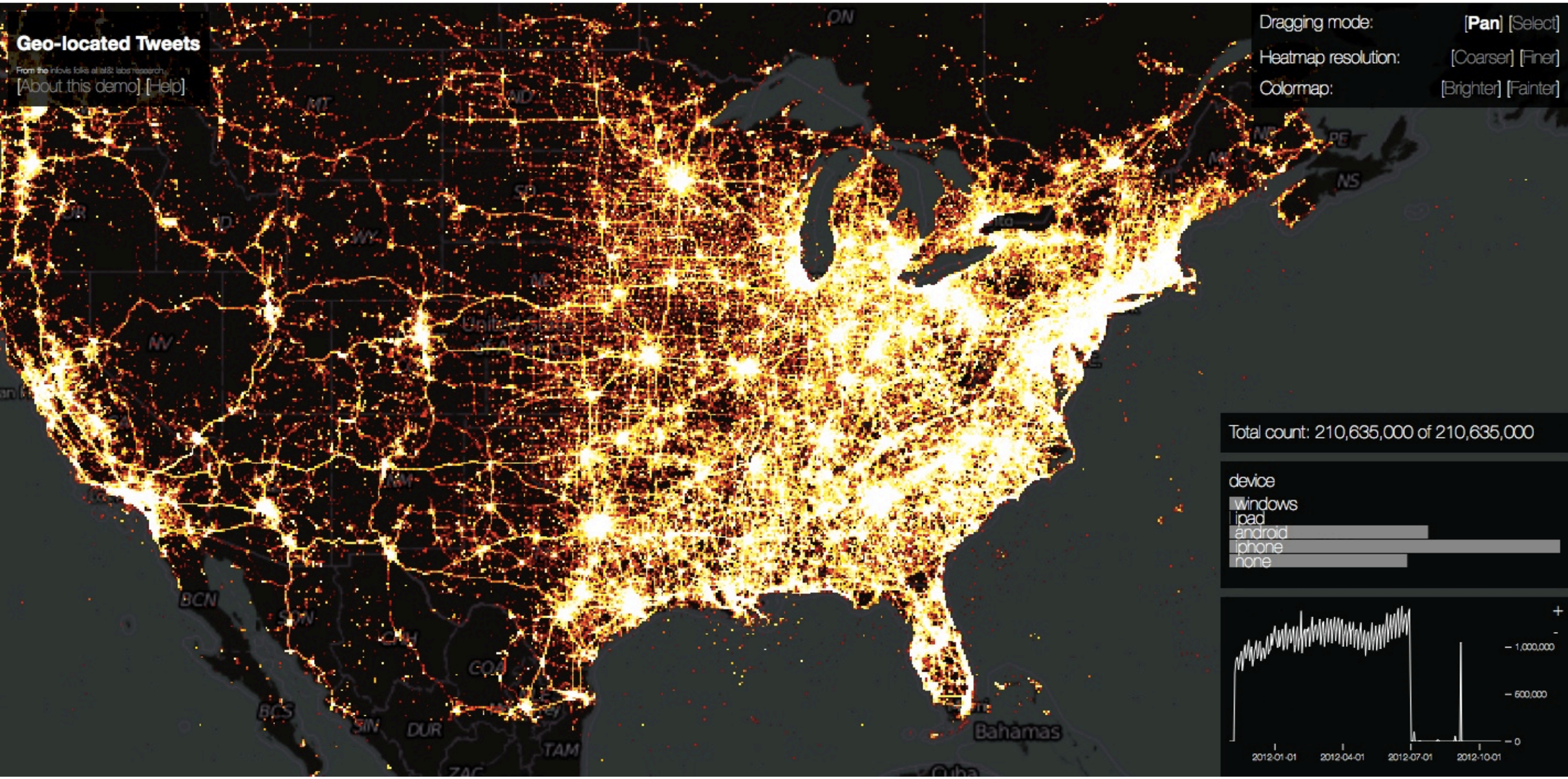
Level 4

Level 5

Level 6

Nanocubes

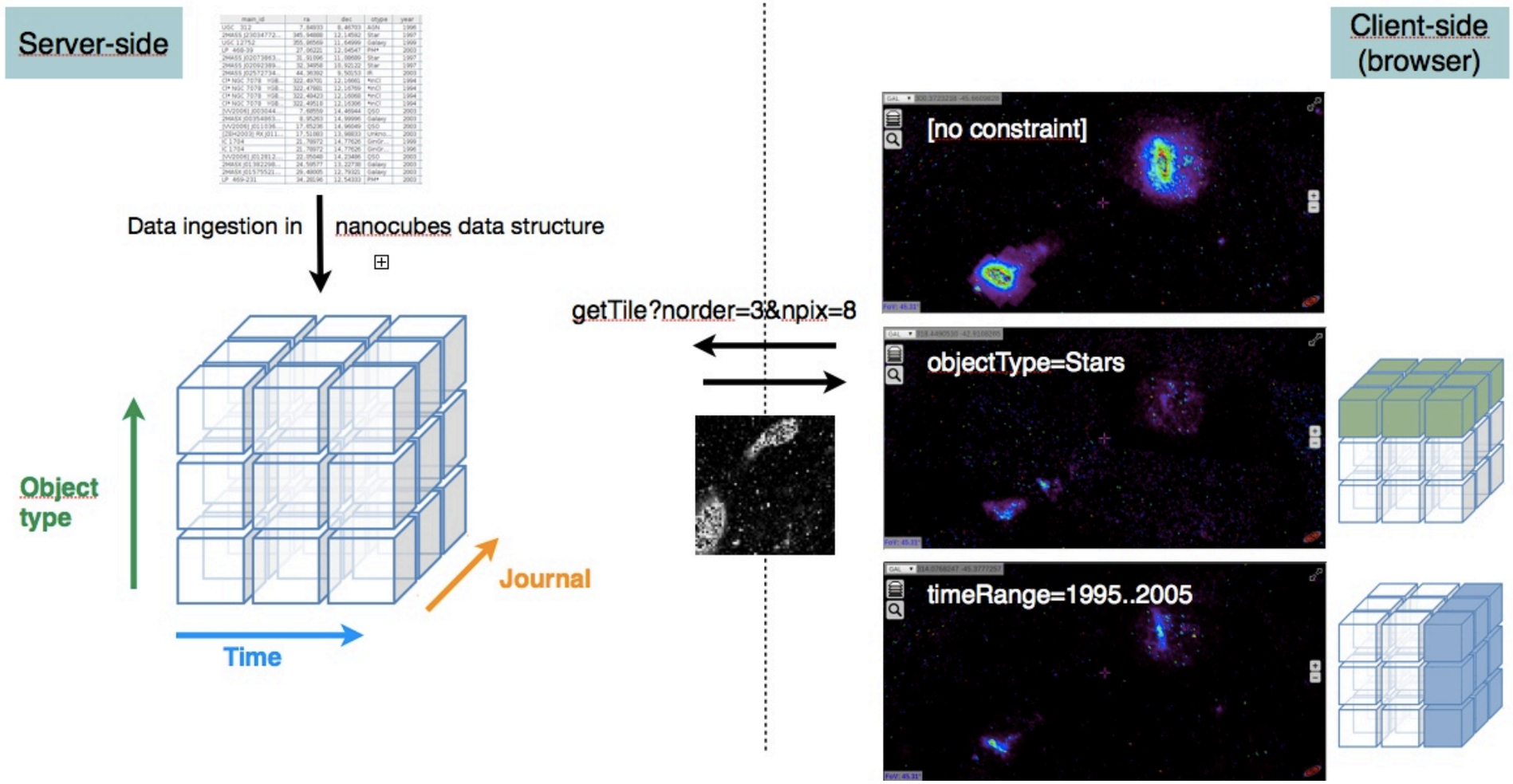
- *AT&T Labs - Research* paper (IEEE Infovis 2013)
  - http://nanocubes.net/
  - *"Real-Time Exploration of Spatiotemporal Datasets"*
    - Data with position, time and a few categorical attributes
- Provides fast generation of
  - 1d-histograms
  - count maps (tiles with spherical Mercator projection)
- C++ code available
  - https://github.com/laurolins/nanocube



Thomas Boch, dynamic generation of HiPS tiles - IVOA Interop, Banff, Oct 2014

JNanocubes

- CDS implementation of nanocubes data structure
  - written in Java
  - outputs HiPS tiles



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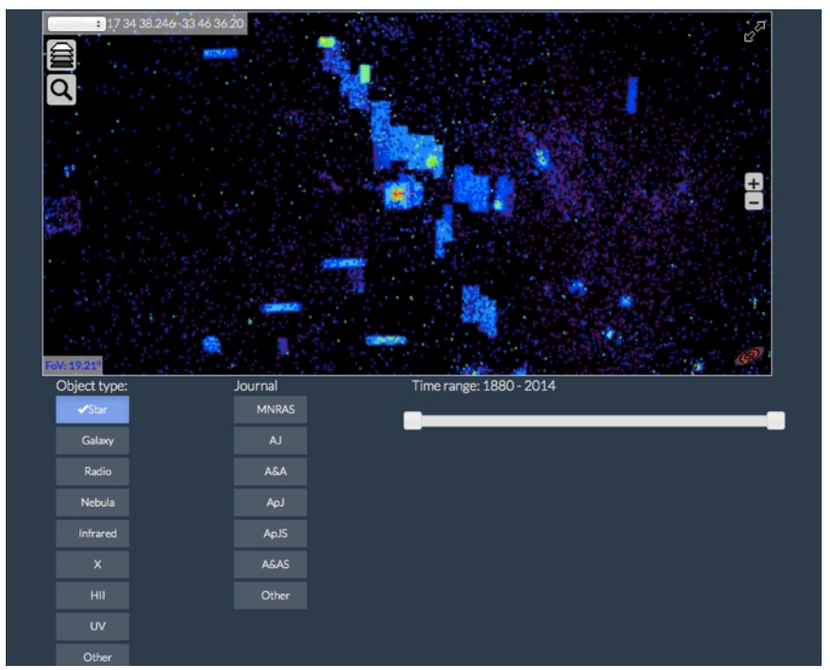
Demo

- Tested on SIMBAD data:
  10M entries with object position,2 categories
  (otype, journal) and a date (publication year)
- Aladin Lite consumes HiPS tiles generated
  on-the-fly by JNanocubes server
- http://tinyurl.com/adass2014



Key figures

- Nanocubes tree generation: 100 s
- Tile generation: 5-20 ms for a 128x128 tile
  (16k requests in nanocube tree)
- Memory greedy: 4 GB

How is that VO-related ?

- Help user explore/drill-down available data
- Similar idea as Tom Donaldson's Guiding Queries with Data Summaries (Hawaii Interop 2013)

Perspectives

- Find a smarter way to organize/serialize nanocube data structure
- Add 1-D histograms for categories and time dimension
- Test it with 100M+ table rows
- Distribute tool to generate JNanocubes