



# FITS Tiled-Table Convention

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# Astronomy is about data

- ◊ Images (pixels)
- ◊ Catalogs (numbers, text, and codes)
- ◊ Hybrid data products (spectra in tables)
- ◊ Metadata (headers)
- ◊ AstroInformatics and the VO



# VO planning is top down:

- ◊ AstroInformatics
- ◊ Metadata (headers)
- ◊ Hybrid data products (data models)
- ◊ Catalogs (numbers, text, and codes)
- ◊ Images (pixels)



# Progress requires traction

- ◊ Traction occurs where rubber meets road
- ◊ Start from the bottom up
  - ◊ FITS tiled-image convention (1998)
  - ◊ FITS tiled-table convention (now)
  - ...
  - ◊ FITS and AstroInformatics (see Vatican)



# Image compression

- Astronomical images have special characteristics:
  - Illuminated rectangular grid
  - Gaussian / Poisson noise model
  - PSF defined by optics
  - etc.
  
- Physics constrains computer science



## ...as a result

- Lossless FITS tile-compression using the Rice algorithm is appropriate for a wide range of astronomical images
- Lossy (“technically lossy”) compression using FPACK q-scaling and subtractive dithering is widely beneficial, especially for images that would otherwise be cast as floating-point



# Table compression

- Tables are used for diverse purposes
- Values in tables are not simply constrained
- Schema are not optimized
- Data types are ad hoc



## ...as a result

- Parameters must be quite general purpose
- Selection of defaults must be driven by sample of representative table use cases
- Without special insight into particular tables, all use cases require lossless techniques
- The most important step occurs when designing the table schema