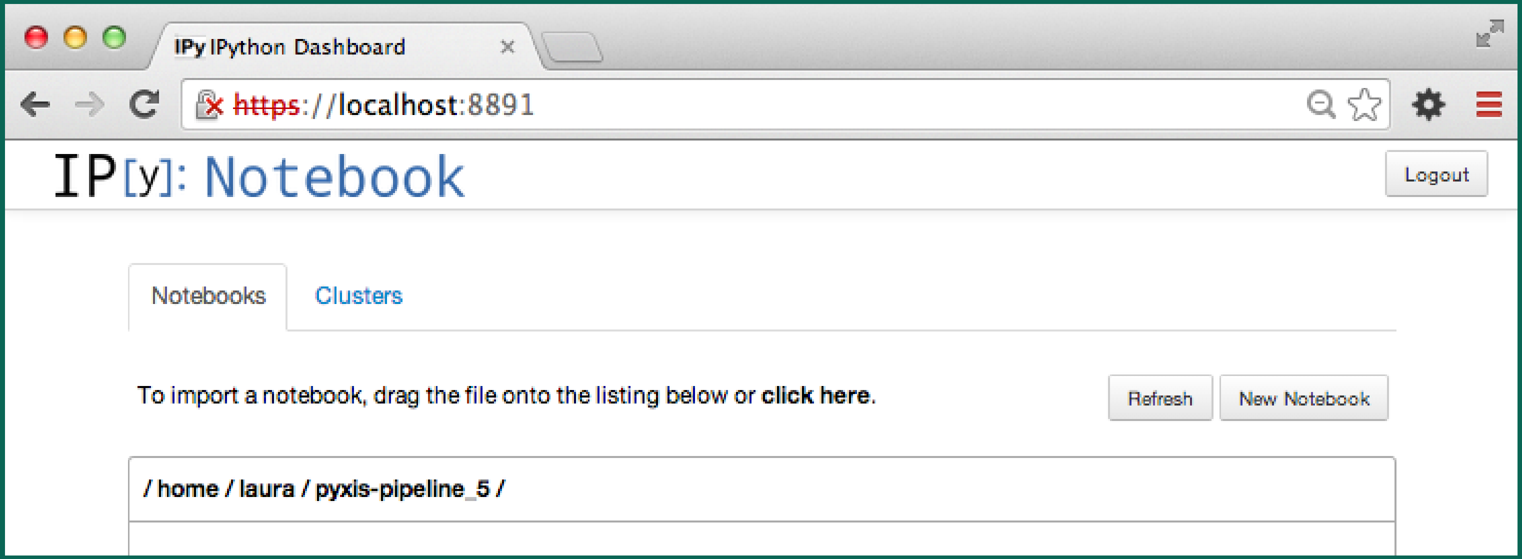
IPython notebook

A pipeline tool

Laura Richter

SKA AFRICA
SQUARE KILOMETRE ARRAY

iPython notebook



Pyxis pipeline notebook

Python eXtensions for Interferometry Scripting

CALIM, Kiama, Australia, March 2014

Pyxis pipeline notebook

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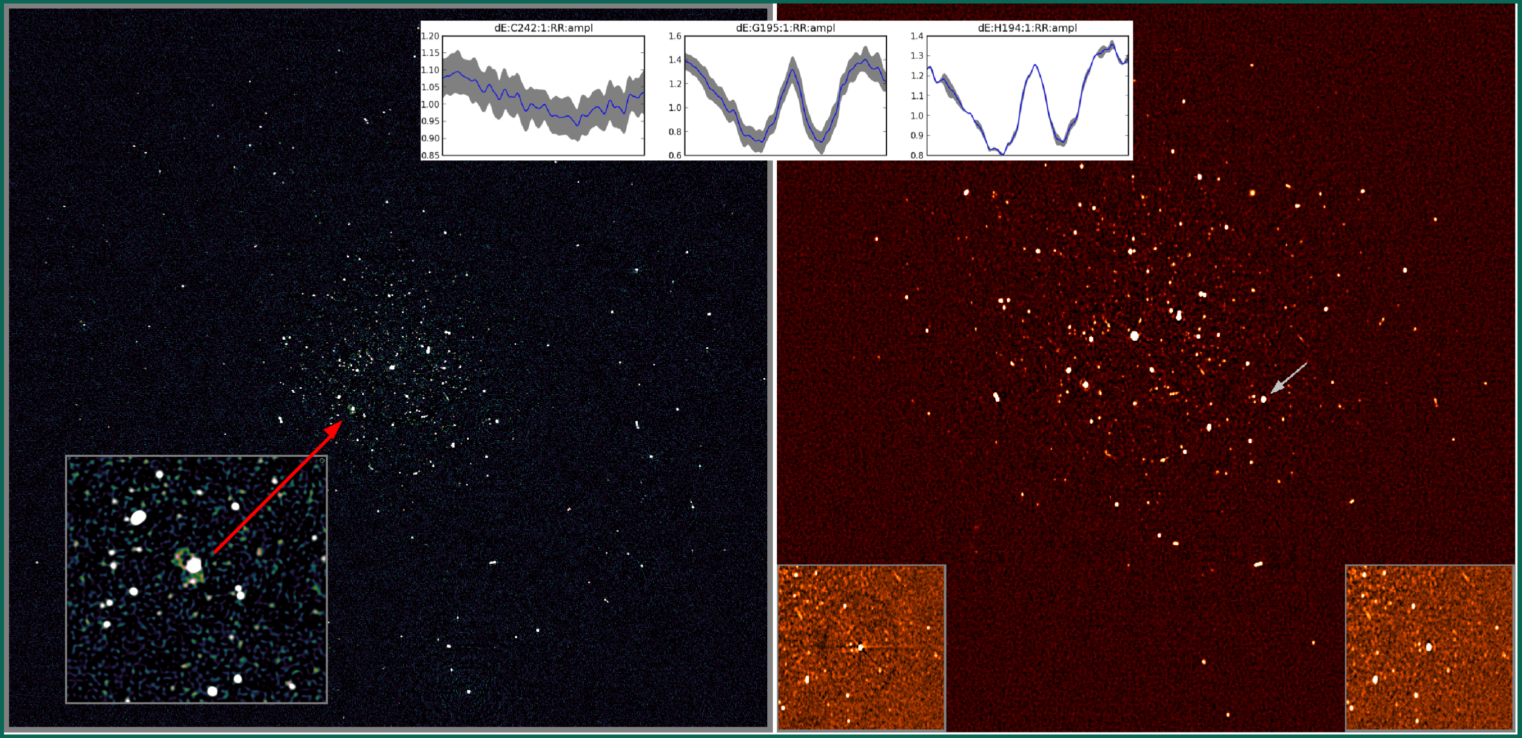

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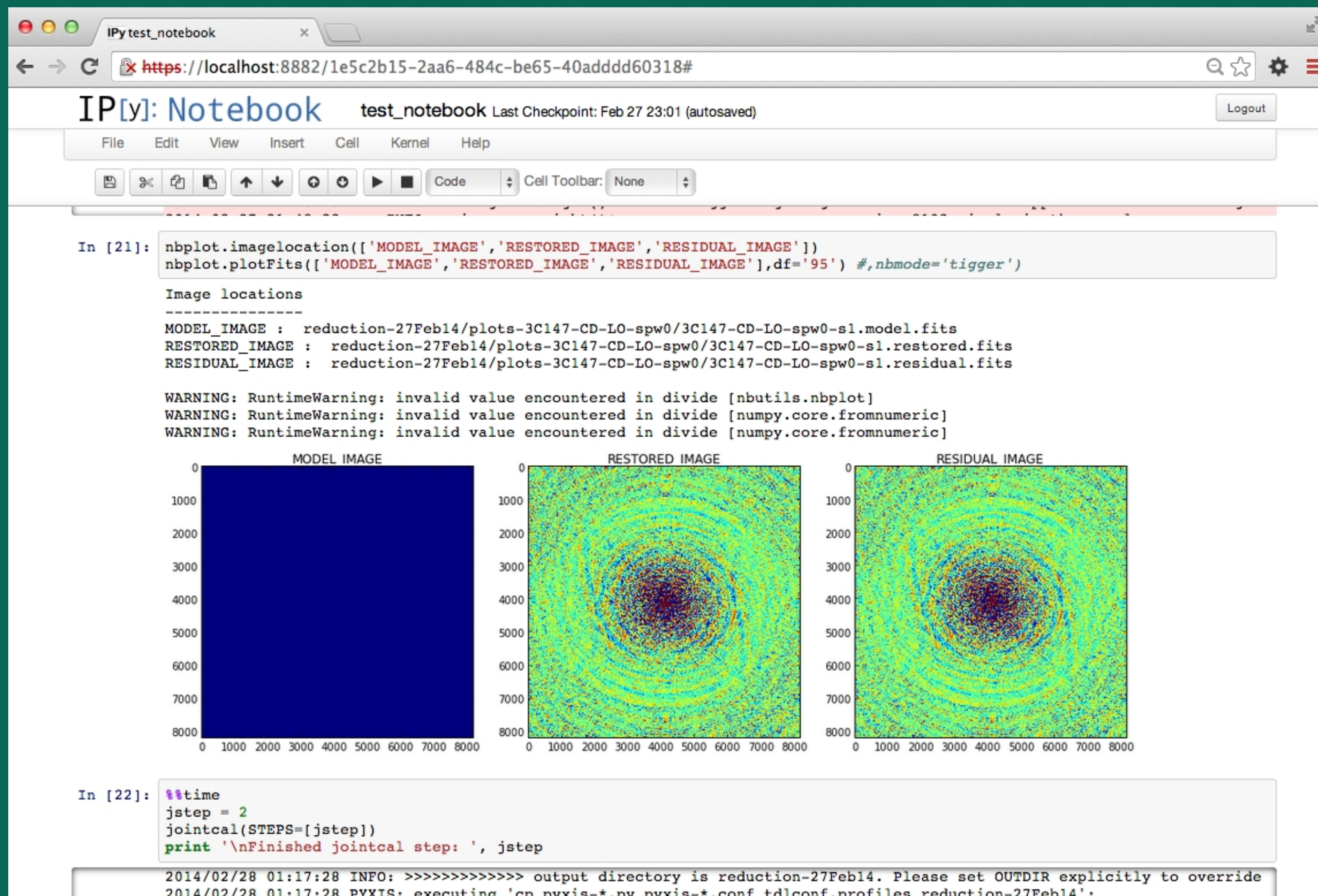
(1) Convenient logging



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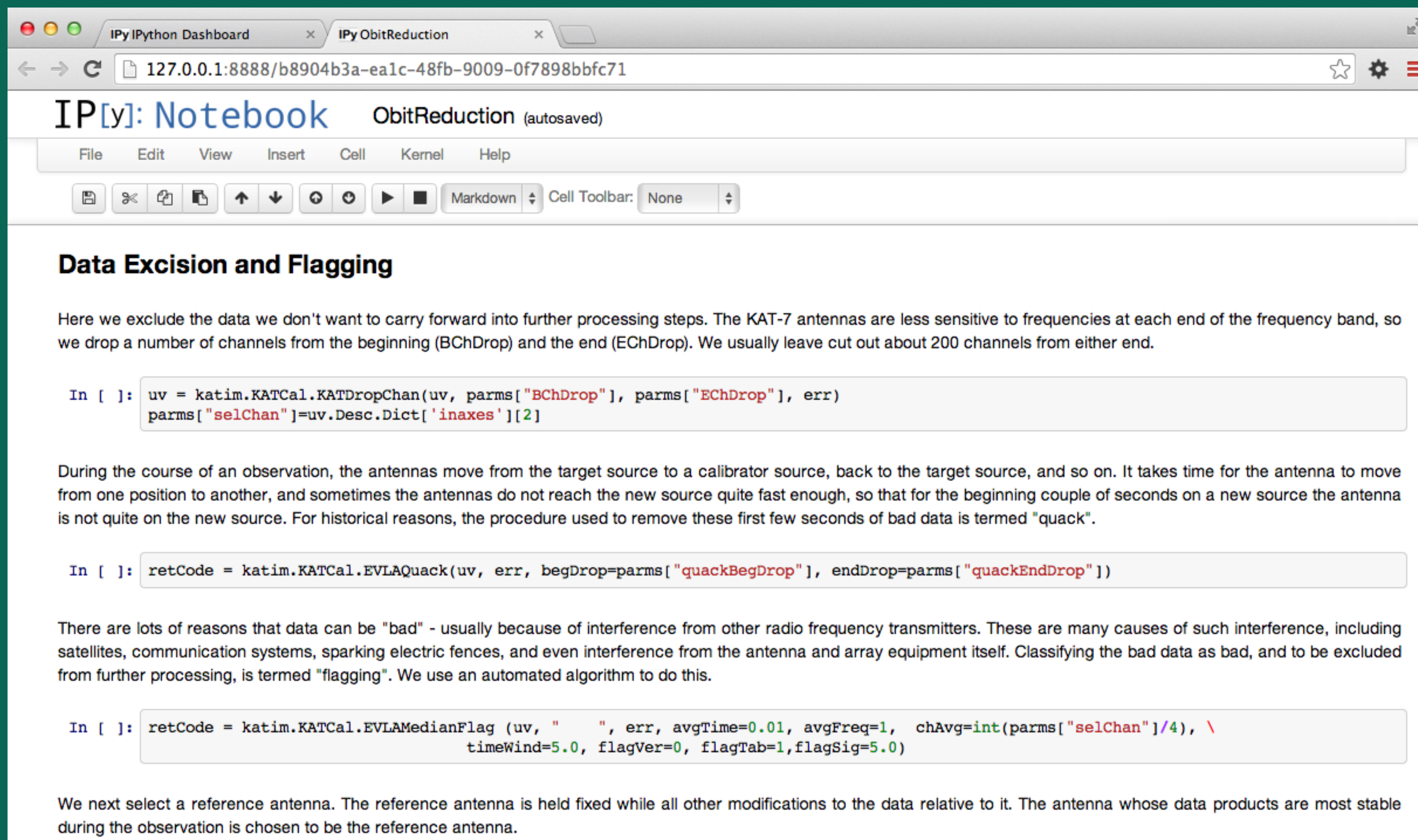
(1) Convenient logging



IPy IPython Dashboard
IPy ObitReduction
127.0.0.1:8888/b8904b3a-ea1c-48fb-9009-0f7898bbfc71

IP[y]: Notebook ObitReduction (autosaved)

File Edit View Insert Cell Kernel Help

Markdown Cell Toolbar: None

Data Excision and Flagging

Here we exclude the data we don't want to carry forward into further processing steps. The KAT-7 antennas are less sensitive to frequencies at each end of the frequency band, so we drop a number of channels from the beginning (BChDrop) and the end (EChDrop). We usually leave cut out about 200 channels from either end.

In [ ]:
```
uv = katim.KATCal.KATDropChan(uv, parms["BChDrop"], parms["EChDrop"], err)
parms["selChan"]=uv.Desc.Dict['inaxes'][2]
```

During the course of an observation, the antennas move from the target source to a calibrator source, back to the target source, and so on. It takes time for the antenna to move from one position to another, and sometimes the antennas do not reach the new source quite fast enough, so that for the beginning couple of seconds on a new source the antenna is not quite on the new source. For historical reasons, the procedure used to remove these first few seconds of bad data is termed "quack".

In [ ]:
```
retCode = katim.KATCal.EVLAQuack(uv, err, begDrop=parms["quackBegDrop"], endDrop=parms["quackEndDrop"])
```

There are lots of reasons that data can be "bad" - usually because of interference from other radio frequency transmitters. These are many causes of such interference, including satellites, communication systems, sparking electric fences, and even interference from the antenna and array equipment itself. Classifying the bad data as bad, and to be excluded from further processing, is termed "flagging". We use an automated algorithm to do this.

In [ ]:
```
retCode = katim.KATCal.EVLAMedianFlag (uv, "    ", err, avgTime=0.01, avgFreq=1,  chAvg=int(parms["selChan"]/4), \
                                       timeWind=5.0, flagVer=0, flagTab=1,flagSig=5.0)
```

We next select a reference antenna. The reference antenna is held fixed while all other modifications to the data relative to it. The antenna whose data products are most stable during the observation is chosen to be the reference antenna.

(2) Teaching, learning, sharing

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"Cookbooks
that are notebooks"

(2) Teaching, learning, sharing

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The kinematics of the Local Group in a cosmological context

Jaime E. Forero-Romero, Yehuda Hoffman, Sebastian Bustamante, Stefan Gottloeber, Gustavo Yepes

(Submitted on 11 Mar 2013)

Recent observations constrained the tangential velocity of M31 with respect to the Milky Way (MW) to be v_tan<34.4 km/s and the radial velocity to be in the range v_rad=-109+/- 4.4 km/s (van der Marel et al. 2012). In this study we use a large volume high resolution N-body cosmological simulation (Bolshoi) together with three constrained simulations to statistically study this kinematics in the context of the LCDM. The comparison of the ensembles of simulated pairs with the observed LG at the 1-sigma level in the uncertainties has been done with respect to the radial and tangential velocities, the reduced orbital energy (e_tot), angular momentum (l_orb) and the dimensionless spin parameter, lambda. Our main results are: (i) the preferred radial and tangential velocities for pairs in LCDM are v_rad=-80+/-20 km/s, v_tan=50+/-10 km/s, (ii) pairs around that region are 3 to 13 times more common than pairs within the observational values, (iii) 15%to 24% of LG-like pairs in LCDM have energy and angular momentum consistent with observations while (iv) 9% to 13% of pairs in the same sample show similar values in the inferred dimensionless spin parameter. It follows that within current observational uncertainties the quasi-conserved quantities that characterize the orbit of the LG, i.e. e_tot, r_orb and lambda, do not challenge the standard LCDM model, but the model is in tension with regard to the actual values of the radial and tangential velocities. This might hint to a problem of the LCDM model to reproduce the observed LG.

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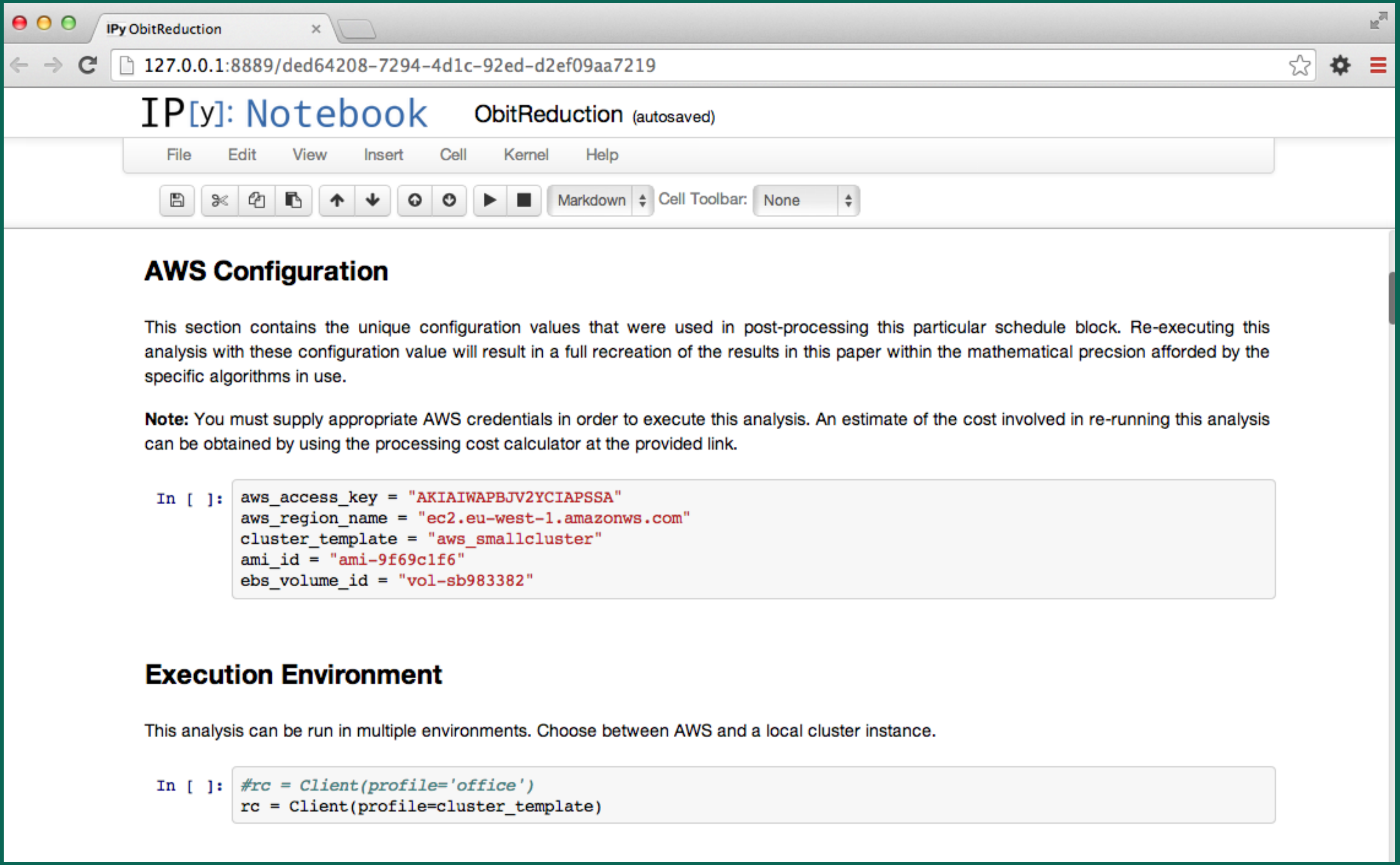

The IPython Notebook:

developing
documenting, and
executing code,
and communicating the results

CALIM, Kiama, Australia, March 2014

Thank you