

# Closing Ruminations on CALIM 2010

Dwingeloo, 22-27 Aug

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# Giving a Conference Summary

- Not a reminder of what has been said
  - You either did not listen
  - Or you are not ready
- Should contain a measure of self-congratulation
- Identification of the Great Trends
  - Sketching the landscape
- But: Inevitable personal filter/bias/prejudice
  - Which can be a Good Thing (in small doses)

# CALIM History

- I. Dwingeloo (2005)
- II. Cape Town (2007)
- III. Perth (2008)
- IV. Socorro (2009)
- V. Manchester → Dwingeloo (2010)
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- VI. Pune? (rethink format?)

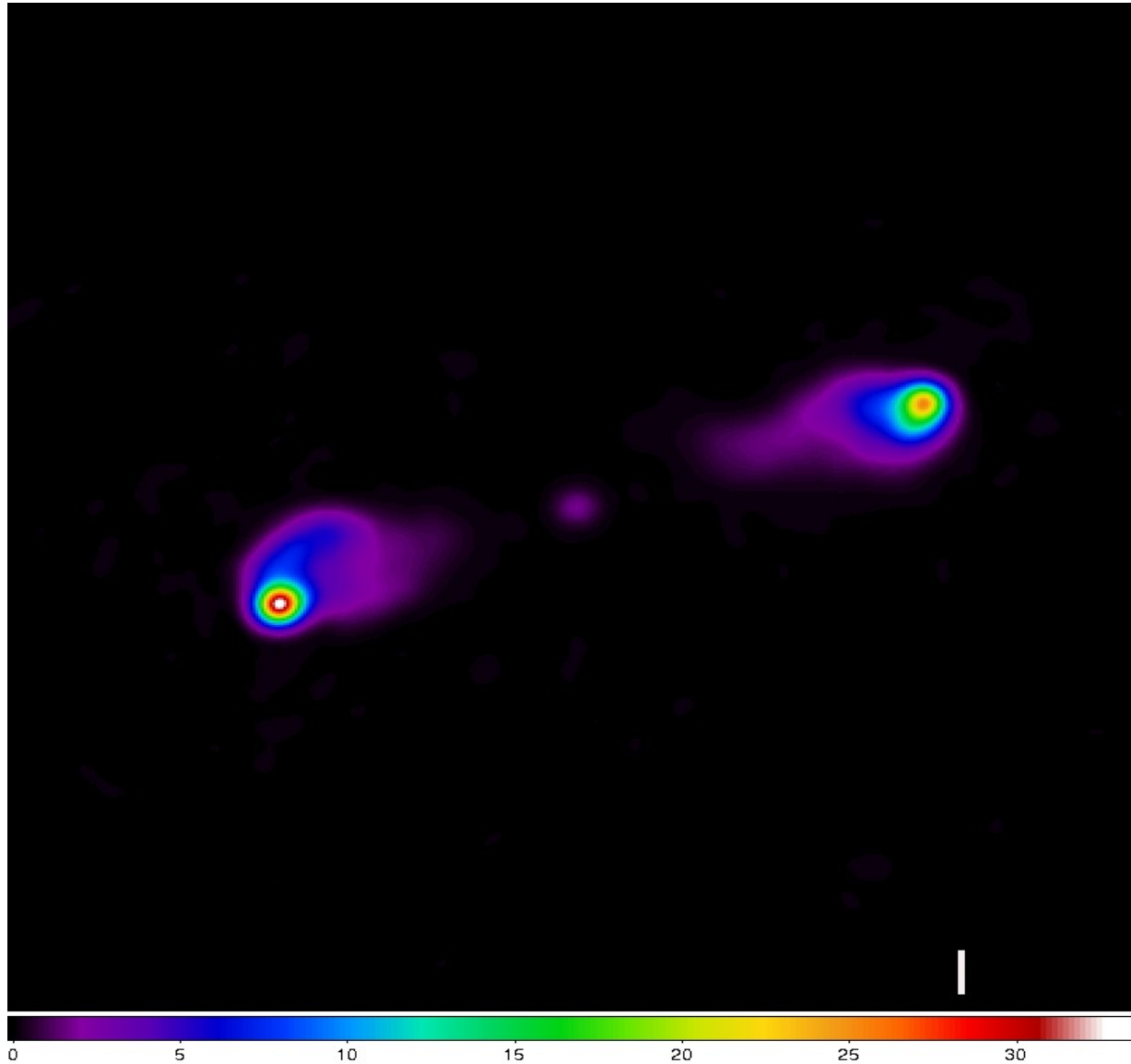
# The Goals of CALIM

- Protecting our Leaders against themselves
  - Dynamic Range (60, 70, 80, ... 1000 dB)
  - Array Configurations (figures of merit)
  - Station technology (AAs, dishes, PAFs, derotation)
- Generating solutions as a Community
- Launching the Next Generation
  - Provide direction, tools, jobs, freedom, ...
- **I think that we have done well this CALIM**

# CALIM evolution over 6 years

- There is a clear monotonic trend, which started with AIPS++ (1990) and is sustained with CALIM
- Less unsubstantiated hand-waving by dinosaurs
- Increasing use of the Lingua Franca (RIME)
- Increasing focus on shared problems
  - DDE's (estimation and application)
  - Keeping our heads above the data stream
- More collaboration and (friendly) competition
- More looking at data/plots/maps together (tools!)

# The CALIM 2010 Image



Cygnus A (EVLA)  
DR 17.000:1

Sarod Yatawatta  
Rick Perley  
Tony Willis

MeqTrees calibration  
CASA Imager

ASTRON/JIVE Image of  
the Day, 26 aug 2010

# The Practical List

- This list was distributed beforehand to all the speakers that “set the scene” on the first day
- They all addressed it (more or less)
- I am NOT going to review it here
- The list should be updated and the exercise be repeated at future CALIMs

# The Fundamental List

- Application of DDE's
  - Unitarity of the Jones matrix?
- Complementarity of Yin and Yang (see below)
- The availability of information (beacons etc)
- Equations vs unknowns (minimize the latter!)
- The number of passes through the uv-data (I/O)
- The number of Major Cycles (uv-plane/image)

# The Fundamental List (II)

- ..
- ..
- ..
- 
- This list should also be updated and discussed at future CALIMs

# Sketching the Landscape (I)

## The 3 Pillars

- Calibration
  - Complicated and sexy: Benign competition
- Imaging
  - Sexy but 'simple': Actual worldwide collaboration
- uv-data handling (incl tools)
  - Unsexy but crucial: Let's get on with it!

# Sketching the Landscape (II)

## 4 Generations of Calibration

- 1GC (<1980): Instrumental Stability (1:100)
- 2GC (>1980): Selfcal, DIE's (a dizzy ride)
- 3GC (>2010): DDE's (1:1.000.000+)
  - In the process of being implemented
- 4GC: “Statistical Analysis of Residuals”
  - This will be REALLY needed in a few years time

# This CALIM: Program Structure (reflects the Issues of the Day)

- Setting the Scene (the practical list)
- Progress in Imaging
- Direction-Dependent Effects (DDE's)
- Phased Arrays
- HPC and uv-data handling
- Simulations
- Miscellaneous (see below)
- Discussion sessions (should be evaluated)

# “Miscellaneous”

- Station Calibration
- RFI mitigation
- Visibility Statistics
- Measurement Equation
- Solver accuracy
- ...
- **NB: Such contributions should be encouraged because they may grow into Major Issues**

# Everyone has EJones Problems

- Primary beams are not identical
- They are polarizing
- They change in time and freq
- They are asymmetric and rotate on the sky
- Open-loop estimation is fast, but limited
- Closed-loop estimation is expensive
- **The good news: It has been demonstrated by Smirnov that mJy field sources may be used**

# The Bottom Line

Show me your beamshape  
And I shall tell you who you are

# Application of DDE's

- This is one of the most urgent issues
- W-coordinate, E Jones, Z Jones, F Jones
- Bhatnagar et al (AWProjection, both directions)
- Abdalla et al (forward application, UVBrick)
- Only when this is solved can we say that AWP is “50 faster than faceting” (Bhatnagar)

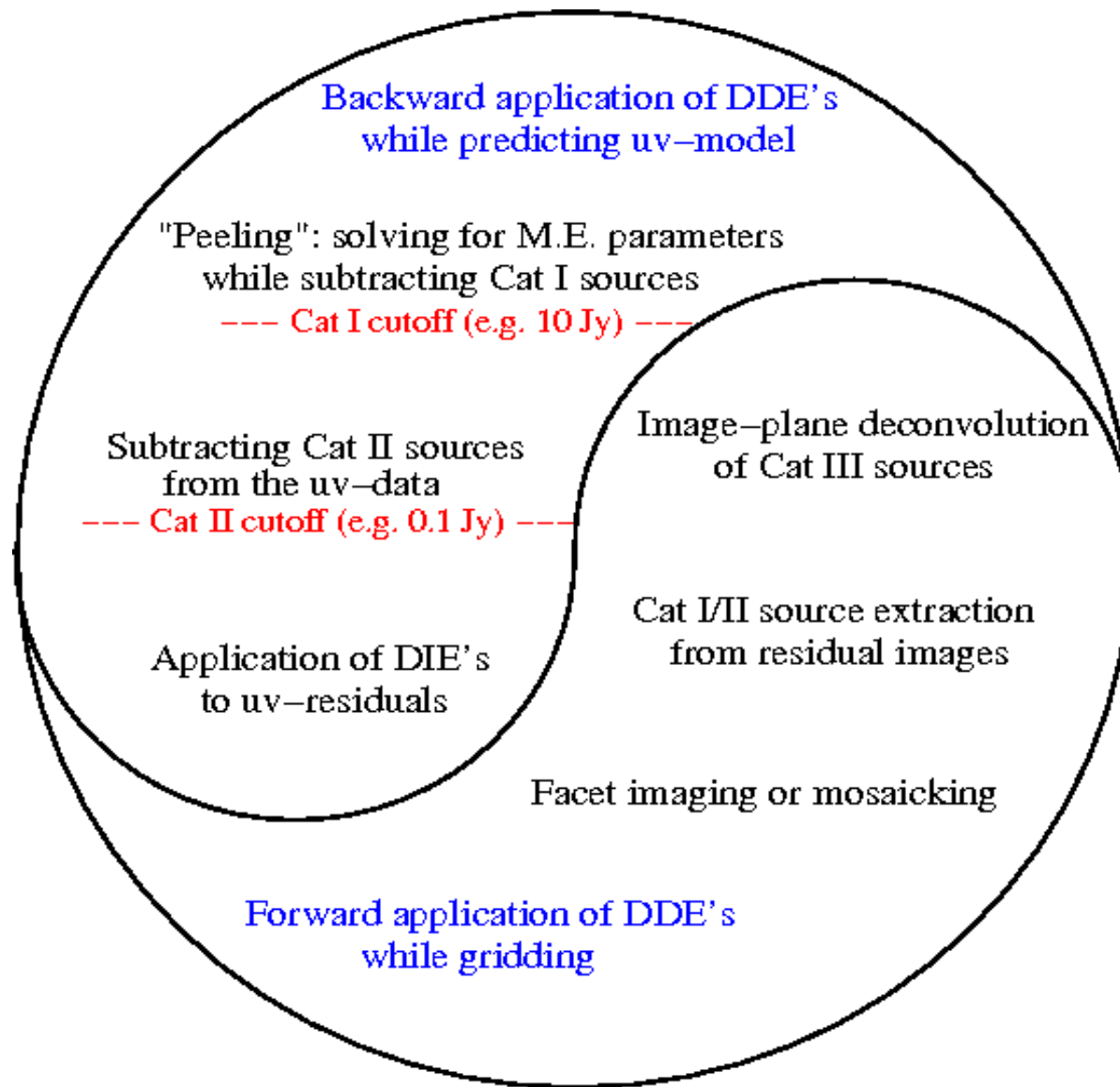


Diagram generated after CALIM 2009 in Socorro, and used as poster for the 3<sup>rd</sup> Generation Calibration workshop in Nancay (France) in Oct-Nov 2009 (It is not entirely up-to-date, but emphasizes the complementarity)

# Yin and Yang (complementarity and trade-offs)

- The “MeqTrees” approach
  - Solving (as much as possible) in the uv-plane
  - Subtracting (as much as possible) in the uv-plane
- 
- The “CASA” approach
  - Solving (as much as possible) in the image plane
  - Emphasis on gridded operations (efficiency)

# Steven Weinberg says (to the New Generation)

- Jump in at the deep end
  - listen to others, but do not take them too seriously
- Look for rough water
  - This is guaranteed for CALIM → SKA
- Don't be afraid to lose time
  - Yeah, right, if your betters give you the room...
- Study the history of your profession
  - Progress does NOT follow the philosophers of science

# Fueling Collaboration

- The CALIM-related Colloquium (now):
  - “Mob Calibration”
  - a.k.a. “Feeding Frenzy”
- Presented by some of the most gifted performers in our field
- With Audience Participation
- Drinkies afterwards (for attendees only)

See you all next year