From abridle Wed Nov 4 12:32:50 1992
X-VM-VHeader: ("From:" "Sender:" "Resent-From" "To:" "Apparently-To:" "Cc:"
"Subject:" "Date:" "Resent-Date:") nil
X-VM-Bookmark: 25
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
      ["574" "Wed" "4" "November" "92" "12:31:44" "-0500" "Alan Bridle" "abridle "
nil "15" "AL270 tape" "^From:" nil nil "11"])
Received: by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
          id AA32034; Wed, 4 Nov 92 12:31:44 -0500
Message-Id: <9211041731.AA32034@polaris.cv.nrao.edu>
From: abridle (Alan Bridle)
To: pags@phx.cam.ac.uk, rl@ast-star.cam.ac.uk
Subject: AL270 tape
Date: Wed, 4 Nov 92 12:31:44 -0500

I have read the tape successfully and now have the dataset FILLed
into AIPS. I will make a FITS format backup of the FILLed dataset
just to be safe.

It looks as though FILLM found data for all the observing time
range but about 5 min. If Robert could send me a copy of his
OBSERVE file I'll make absolutely sure. I think the 5 min is
just the time missing at the start (setup and drive time).

We were without ant 15 (pad N32) for most of both days (servo
problems, was stuck in elevation) and ant 25 (pad N56) for
the second day (focus/rotation problem).

Cheers, A.

From root Wed Nov 4 13:17:33 1992
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
      ["17050" "Wed" "4" "November" "92" "18:15" "GMT" "\"Robert Laing, RGO,
Cambridge\"" "\"CAVAD::RL\"@STARLINK.ASTRONOMY.CAMBRIDGE.AC.UK" nil "238" "As
requested" "^From:" nil nil "11"])
Received: from sun2.nsfnet-relay.ac.uk by polaris.cv.nrao.edu (AIX 3.1/UCB
5.61/1.0)
          id AA31917; Wed, 4 Nov 92 13:17:01 -0500
Message-Id: <9211041817.AA31917@polaris.cv.nrao.edu>
Via: uk.ac.cambridge.astronomy.starlink; Wed, 4 Nov 1992 18:15:42 +0000
From: "Robert Laing, RGO, Cambridge"
<"CAVAD::RL"@STARLINK.ASTRONOMY.CAMBRIDGE.AC.UK>
To: ABRIDLE <ABRIDLE@polaris.cv.nrao.edu>
Subject: As requested
Date: Wed, 4 Nov 92 18:15 GMT

Dear Alan,
          There follow the two files.   I talked to Peter today. He
said that Steven Turner was having some difficulty in obtaining funding
for the trip, but that there was a possibility that things could be
sorted out. He will contact you directly.

  Cheers, Robert

/.AL270   377
//* ***
//* *** NRAO VLA Observe Program, Version V3.1.7, 1991.2.11
//* ***
//* *** Observation day 55,632 at 07 30 00 LST, 1992.10.31 05:01:30 MST.
//* ***
//* *** Observer
//* *** R.A. Laing,   Phone
//* *** RGO, Madingley Road,   Office: (   )
//* *** Cambridge CB3 0HE,   During observation: (   )
//* *** U.K.
//* *** Tel UK (44) 223 374720
//* ***
//* *** E-Mail address
//* *** RL@UK.AC.CAMBRIDGE.ASTRONOMY.STARLINK
//* ***
//* *** Observing mode(s): Continuum
//* ***
//* *** Special Instructions
//* *** Address up till and including Nov 2nd: Istituto di Radioastronomia,
//* *** Via Irnerio 46, Bologna, Italy. E-mail ASTBO1::RLAING (SPAN).
//* *** E-mail via Cambridge will also work.
//* ***
//* ***
0722+145   07 40 00 07 22 26.9663 +14 31 12.285   LL   A   2222   0.85
//DS   10
//LO   -3.2   -3.2   3610   3660
//FISF   101.150000   201.150000
3C175   08 10 00 07 10 15.3800 +11 51 24.000   LL   2222
//DS   10
//LO   -3.2   -3.2   3610   3660
//FISF   101.150000   201.150000
0722+145   08 13 00 07 22 26.9663 +14 31 12.285   LL   A   2222   0.85
//DS   10
//LO   -3.2   -3.2   3610   3660

```
//FISF              101.150000          201.150000
1053+704      08 20 00 10 53 27.7200 +70 27 47.900     LL   C   2222   0.53
//DS              10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
3C263         08 50 00 11 37 09.3000 +66 04 27.000     LL       2222
//DS              10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1053+704      08 53 00 10 53 27.7200 +70 27 47.900     LL   C   2222   0.53
//DS              10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
0722+145      08 59 00 07 22 26.9663 +14 31 12.285     LL   A   2222   0.85
//DS              10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
3C175         09 29 00 07 10 15.3800 +11 51 24.000     LL       2222
//DS              10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
0722+145      09 32 00 07 22 26.9663 +14 31 12.285     LL   A   2222   0.85
//DS              10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1053+704      09 37 30 10 53 27.7200 +70 27 47.900     LL   C   2222   0.53
//DS              10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
3C263         10 07 30 11 37 09.3000 +66 04 27.000     LL       2222
//DS              10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1053+704      10 10 00 10 53 27.7200 +70 27 47.900     LL   C   2222   0.53
//DS              10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
0722+145      10 15 30 07 22 26.9663 +14 31 12.285     LL   A   2222   0.85
//DS              10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
3C175         10 45 30 07 10 15.3800 +11 51 24.000     LL       2222
//DS              10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
0722+145      10 48 30 07 22 26.9663 +14 31 12.285     LL   A   2222   0.85
//DS              10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1053+704      10 53 30 10 53 27.7200 +70 27 47.900     LL   C   2222   0.53
//DS              10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
3C263         11 23 30 11 37 09.3000 +66 04 27.000     LL       2222
//DS              10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1053+704      11 26 30 10 53 27.7200 +70 27 47.900     LL   C   2222   0.53
//DS              10
```

```
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1328+307      11 37 30 13 28 49.6570 +30 45 58.640     LL   C   2222  14.70
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1607+268      11 42 00 16 07 09.2890 +26 49 18.600     LL   C   2222   4.70
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
3C334         12 22 00 16 18 07.3300 +17 43 29.600     LL       2222
//DS            10

//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1607+268      12 25 00 16 07 09.2890 +26 49 18.600     LL   C   2222   4.70
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1053+704      12 30 00 10 53 27.7200 +70 27 47.900     LL   C   2222   0.53
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1607+268      12 35 00 16 07 09.2890 +26 49 18.600     LL   C   2222   4.70
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
3C336         12 48 00 16 22 32.2100 +23 52 01.300     LL       2222
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1607+268      12 51 00 16 07 09.2890 +26 49 18.600     LL   C   2222   4.70
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
3C334         13 31 00 16 18 07.3300 +17 43 29.600     LL       2222
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1607+268      13 34 00 16 07 09.2890 +26 49 18.600     LL   C   2222   4.70
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
3C336         13  1 30 16 22 32.2100 +23 52 01.300     LL       2222
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1607+268      13 54 30 16 07 09.2890 +26 49 18.600     LL   C   2222   4.70
//DS            10                                          2
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
3C334         14 34 30 16 18 07.3300 +17 43 29.600     LL       2222
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1607+268      14 37 30 16 07 09.2890 +26 49 18.600     LL   C   2222   4.70
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
```

```
3C336         14 55 00 16 22 32.2100 +23 52 01.300     LL       2222
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1607+268      14 58 00 16 07 09.2890 +26 49 18.600     LL   C   2222   4.70
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
3C334         15 18 30 16 18 07.3300 +17 43 29.600     LL       2222
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1607+268      15 21 30 16 07 09.2890 +26 49 18.600     LL   C   2222   4.70
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000
1328+307      15 30 00 13 28 49.6570 +30 45 58.640     LL   C   2222  14.70
//DS            10
//LO     -3.2   -3.2      3610      3660
//FISF              101.150000          201.150000

/.AL270   377
//* ***
//* *** NRAO VLA Observe Program,  Version V3.1.7, 1991.2.11
//* ***
//* *** Observation day 55,633 at 19 00 00 LST, 1992.11.01 16:24:30 MST.
//* ***
//* *** Observer
//* *** R.A. Laing,                                              Phone
//* *** RGO, Madingley Road,                          Office: (   )
//* *** Cambridge CB3 0EZ,                 During observation: (   )
//* *** UNITED KINGDOM.
//* *** Tel (44)223 374720
//* ***
//* *** E-Mail address
//* *** RL@UK.AC.CAMBRIDGE.ASTRONOMY.STARLINK
//* ***
//* *** Observing mode(s): Continuum
//* ***
//* *** Special Instructions
//* *** Contact address up to and including Nov 3: Istituto di Radioastronomia
//* *** Via Irnerio 46, Bologna, ITALY.  E-mail ASTBO1::RLAING (SPAN)
//* ***
//* *** PLEASE HOLD ON 3C286 (FIRST SCAN) TO GET ABOUT 3 MIN GOOD DATA.
//* ***
//*                                                                          .13
28+307       19 12 00 13 28 49.6570 +30 45 58.640     LL   C   0000
//DS            10
//LO     -3.2   -3.2      3640      3690
//FISF              100.000000          200.000000
2033+181      19 19 30 20 33 18.0320 +18 46 40.050     LL   C   0000
//DS            10
//LO     -3.2   -3.2      3640      3690
//FISF              100.000000          200.000000
3C432         19 49 30 21 20 25.5290 +16 51 46.400     LL       0000
//DS            10
//LO     -3.2   -3.2      3640      3690
//FISF              100.000000          200.000000
2033+181      19 52 30 20 33 18.0320 +18 46 40.050     LL   C   0000
```

```
//DS            10
//LO     -3.2   -3.2      3640      3690
//FISF              100.000000          200.000000
3C432         20 22 00 21 20 25.5290 +16 51 46.400     LL       0000
//DS            10
//LO     -3.2   -3.2      3640      3690
//FISF              100.000000          200.000000
2033+181      20 25 00 20 33 18.0320 +18 46 40.050     LL   C   0000
//DS            10
//LO     -3.2   -3.2      3640      3690
//FISF              100.000000          200.000000
3C432         20 57 00 21 20 25.5290 +16 51 46.400     LL       0000
//DS            10
//LO     -3.2   -3.2      3640      3690
//FISF              100.000000          200.000000
2033+181      21 00 00 20 33 18.0320 +18 46 40.050     LL   C   0000
//DS            10
//LO     -3.2   -3.2      3640      3690
//FISF              100.000000          200.000000
```

From root Tue Nov 10 11:27:03 1992
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
["1655" "Tue" "10" "November" "92" "16:26:23" "GMT" "PAGS@phx.cam.ac.uk"
"PAGS@phx.cam.ac.uk" nil "27" "Re: [Messages]" "^From:" nil nil "11"])
Received: from gray.csi.cam.ac.uk by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
id AA26143; Tue, 10 Nov 92 11:26:57 -0500
Received: from phx.cam.ac.uk by ppsw1.cam.ac.uk
with NIFTP (PP-6.0) Cambridge as ppsw.cam.ac.uk
id <03168-0@ppsw1.cam.ac.uk>; Tue, 10 Nov 1992 16:26:39 +0000
Message-Id: <A692F48CFECB0000@UK.AC.CAMBRIDGE.PHOENIX>
In-Reply-To: <9211101531.AA24272@polaris.cv.nrao.edu>
From: PAGS@phx.cam.ac.uk
To: (Alan Bridle) abridle <abridle@polaris.cv.nrao.edu>
Subject: Re: [Messages]
Date: Tue, 10 Nov 92 16:26:23 GMT

Dear Alan,

many thanks for your messages. I went quiet for a while because there
was a lot of real doubt about travel funds for Stephen; there is now
a sufficient probability of money from his College to go ahead.

Learning about AIPS: Stephen has a little bit of experience of making
aips maps now, using some old data of Paul Alexander's, so he should
be able to start from square two. Ideally I would like him to learn the
whole process on one source anyway, but the first priority has to be to
get reliable spectral indices. Now I am not sure I understand your
question properly: presumably we have to get self-calibrated data sets
to make good maps, so would scheme B (allowing time for some spectral
and depolarization comparisons while ST is still with you) mean a quick
and relatively dirty look, with the final, self-calibrated maps to be made
later? Or does it mean making the final self-cal'ed maps but starting where
you've got to, i.e. ST would not learn about applying the external
calibrations, editing the data - all the early processing stages ?
I'd be quite happy with the latter, as he will still learn about self-
-calibration, making spectral index comparisons and all that, and there will
be only a restricted amout of map processing left to do here, and I would
guess those parts which require least intimate knowledge of the black arts
Yesterday I spoke with Robert, and he hopes to come to Charlottesville in
mid-December to visit you; that way he will also provide very valuable
continuity of knowledge about the state of the data between Charlottesville
and Camville.

Best wishes Peter

From abridle Tue Nov 10 14:02:40 1992
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
["3027" "Tue" "10" "November" "92" "14:02:13" "-0500" "Alan Bridle" "abridle
" nil "68" "Calibration" "^From:" nil nil "11"])
Received: by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
id AA22030; Tue, 10 Nov 92 14:02:13 -0500
Message-Id: <9211101902.AA22030@polaris.cv.nrao.edu>
From: abridle (Alan Bridle)
To: pags@phx.cam.ac.uk
Subject: Calibration
Date: Tue, 10 Nov 92 14:02:13 -0500

Sorry, I should have made things a bit clearer.

Wherever he starts, my goal is for him to take away final self-calibrated images for all five sources. My guess is that we will have time for either:

```
================================================================
Start from raw data ----> self cal images ---> not much analysis
================================================================

                          or

================================================================
Start from what I have ---> self cal images ----> some analysis
done before he arrives
================================================================
```

The former would take him through the whole business of dealing with a data set as it arrives raw from the VLA (flux density bootstrapping synthesis calibrators to 3C286 w different u-v ranges for different sources, amplitude and phase calibration for all antennas using the synthesis calibrators, determining antenna polarization corrections, normalization of the L-R phase difference on 3C286, imaging the externally calibrated data). There isn't much "black art" in this, it's pretty standard book-keeping. And the data appear to be in good enough shape "raw" that there isn't any editing trickery needed.

The latter would skip all of the external calibration stuff (I'd walk him through the printouts to show him what I did, as I'm keeping all of them) and start with self-calibration based on the initial CLEAN components from the externally calibrated images. Depending on your view of what's "black" in our art, there may be some blacker areas in this. (I remember when all of deconvolution was pretty black as viewed from Cambridge, but I'm presuming that's merely grey these days?).

At the "back end" of analysis we will want to compare with the B array images from the 6cm data. Because these were combined (and cross-calibrated) with the A array data for the counterjets project, they were not necessarily taken to the point of making the "best" B-array only images in every case. I'll go through that history carefully either while he's here or before he comes. It will be worth putting all of the self-calibrated 6cm B array uv data onto one tape for him to take back to Cambridge in any case.

I think it will be worth taking at least one source "all the way" through to the end of the planned analysis while he's here just so we can talk together about strategies at each of the various steps. I think we'll have time for that wherever we start from, but obviously there's more time to kick around the "back end" strategies if we start from my processing of the data than if we go back to the raw tape.

Either way, I suggest he should return to Cambridge with:

a) copy of the raw 21cm VLA archive tape
b) copy of the self-calibrated 21cm uv data and images
c) copy of the 6cm self-calibrated uv data

That way, you can do as much or as little recalibration as you need once he's back home.

Hope that's clearer. If not, try again!

Cheers, A.

From abridle Tue Nov 10 10:31:50 1992
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
      ["1750" "Tue" "10" "November" "92" "10:31:32" "-0500" "Alan Bridle" "abridle
" nil "39" "Messages" "^From:" nil nil "11"])
Received: by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
          id AA24272; Tue, 10 Nov 92 10:31:32 -0500
Message-Id: <9211101531.AA24272@polaris.cv.nrao.edu>
From: abridle (Alan Bridle)
To: pags@phx.cam.ac.uk
Subject: Messages
Date: Tue, 10 Nov 92 10:31:32 -0500

Hello again Peter,

Some messages back and forth to/from Stephen Turner seem to be
getting "stuck" en route, so this is partly for redundancy.
It's just fine for him to arrive on any of the three days
between Nov.23 and 25 and to return Dec 14/15. It will
probably work out best for him to stay with us until just
after the holiday weekend, then move into Alden House once
he really gets going. Robert is also going to come out
near the end of the trip.

Are you o.k. for the cost of Alden House for a couple of weeks?
Would be $300 for 2 weeks. If that's a problem, he can stay on
with us, but this may be a bit less efficient.

I've taken a quick look at the data with a quick-and-dirty external
calibration and have made preliminary (externally calibrated, CLEANed)
images of 3C175, 3C263, 3C334 and 3C336. Everything looks "normal".
I could certainly have the whole data set externally
calibrated (flux density and polarization) before Stephen
arrives, so he would just need to work on the self-calibration.

Now -- do you want him to learn all this for himself. I.e. shall I
just give him the archive tape raw from the VLA and have him do
everything for himself? I have gone through to making quick images
simply to check there are no obvious problems with the dataset, in
which case the 3 weeks he's here should be plenty for getting the
"best" self-calibrated images from scratch. But if you're more
interested in getting on with analysis soon, he could start with the
externally-calibrated data as I now have it and we might then have
time for some spectral and depolarization comparisons with the 6cm
B-config data while he's here.

I'm happy either way, just let me know what your goals are for him
to be learning.

Cheers, Alan

From abridle Wed Nov 11 10:09:39 1992
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
      ["1167" "Wed" "11" "November" "92" "10:09:00" "-0500" "Alan Bridle" "abridle
" nil "24" "AL270 polarization calibration" "^From:" nil nil "11"])
Received: by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
          id AA05896; Wed, 11 Nov 92 10:09:00 -0500
Message-Id: <9211111509.AA05896@polaris.cv.nrao.edu>
From: abridle (Alan Bridle)
To: pags@phx.cam.ac.uk, rl@ast-star.cam.ac.uk
Subject: AL270 polarization calibration
Date: Wed, 11 Nov 92 10:09:00 -0500

It looks to me as though we have a small problem with the polarization position-angle calibration for the AL270 run. The 3C286 position angle data are unusually inconsistent, with a variation of about 15 degrees between the two observations roughly 3 hours apart. As this was roughly mid-day we may be seeing some ionospheric rotation.

This is obviously irrelevant for the spectral-asymmetry question, but I am wondering whether you were also wanting to use these data for any RM measurements. (The additional systematic RM uncertainty is about 5 rad/m^2, and there may of course also be a little false depolarization in the synthesized polarization images.)

Possibly this variation will correct out with FARAD once the ionospheric electron content data are available from Boulder, but these will likely not be on-line until some time next year. There may also be some data-quality problems as the internal consistency of the phase calibration on 3C286 is worse than usual. I'll kick this around a little but don't have a lot of time to spend on it at the moment.

Q. Do we just ignore this issue as "off-topic", or try to do something about it?

Cheers, A.

From abridle Wed Nov 11 17:39:29 1992
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
      ["1589" "Wed" "11" "November" "92" "17:36:45" "-0500" "Alan Bridle" "abridle
" nil "31" "Ionospheric(?) problem" "^From:" nil nil "11"])
Received: by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
          id AA07544; Wed, 11 Nov 92 17:36:45 -0500
Message-Id: <9211112236.AA07544@polaris.cv.nrao.edu>
From: abridle (Alan Bridle)
To: pags@phx.cam.ac.uk, rl@ast-star.cam.ac.uk
Subject: Ionospheric(?) problem
Date: Wed, 11 Nov 92 17:36:45 -0500

After finding the problem with the L-R phase calibration for 3C286 I've looked at the L-R phase solution behaviour throughout the October 31 run. For most antennas and most times things look fairly normal for L Band, with "features" in the data that are only a few degrees in amplitude over an hour or so. But there are some localized "phase difference events", one of which is very close to our first observation of 3C286, in which there are some excursions of tens of degrees in short time spans, especially when we are looking towards the East. This has a strong smell of ionosphere though I'm still a bit puzzled by the some of the antenna-to-antenna differences, and there may be an instrumental glitch on one antenna in particular.

Right now I've eyeballed my way through what looks like a very noisy angle calibration on 3C286, and have made a polarization image for it that claims 10% polarization at p.a. 30deg. I can't lay my hands on the "correct" value for the percentage at the moment, but the angle should be 33deg, so things may be averaging out a bit better than I thought they would.

We may be able to say that the large angle uncertainties are confined to specific times and antennas, and deal with that by editing or by a more sophisticated angle calibration. But I'll do no more on this for the moment now that I've reassured myself that things are coming out o.k. at least to first order.

Again, we should probably consider just what we will try to extract from the polarimetry before deciding how much to chase these fluctuations down further.

Cheers, A.

From abridle Fri Nov 13 12:20:20 1992
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
["3027" "Fri" "13" "November" "92" "12:19:42" "-0500" "Alan Bridle" "abridle
" nil "57" "Re: Visiting Charlottesville" "^From:" nil nil "11"])
Received: by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
id AA22706; Fri, 13 Nov 92 12:19:42 -0500
Message-Id: <9211131719.AA22706@polaris.cv.nrao.edu>
References: <9211112245.AA16083@polaris.cv.nrao.edu>
<A696AF689506EC00@UK.AC.CAMBRIDGE.PHOENIX>
From: abridle (Alan Bridle)
To: ST115@phx.cam.ac.uk
Subject: Re: Visiting Charlottesville
Date: Fri, 13 Nov 92 12:19:42 -0500

Dear Stephen,

Thanks for the information. I will meet you off the flight at the Charlottesville airport, and plan to take you straight to our house. The hour may be fairly civilized, but you'll find the jet lag will catch up with you still!

Re data tapes, I have all of the 6cm data for these quasars here, on a variety of tapes. I'm going to make sure I can read all the vital tapes (which are 9-tracks) and copy the data onto an Exabyte or a DAT tape, before you leave. If I have trouble resuscitating anything important, I'll let you know. But I believe all that Robert has over there are copies of the image tapes, of which I have several versions available here. I mentioned to Peter that not all of the 6cm B-array data had been as fully self-calibrated on their own as they could be -- this is because they were being combined with A array data for the 6cm imaging project, and so were cross- calibrated on higher-resolution models as part of that process. Because of this, there may be a small amount of tweaking of the B-array 6cm data that's still worth doing for the spectral comparisons.

Anyway, the bottom line on your question is: I don't think you need to bring any tapes from Cambridge.

I did mention to Peter, but have not heard from him about it since, that you will need to pay the accommodation bill from Alden House while you are here (i.e., they won't want to simply bill the Cavendish Lab for it). The best way to do this, and probably the best way to bring over what you will need for cash-in-hand, will be to bring dollar traveller's cheques. As Charlottesville is a (relatively) small town and the American banking system is a bit archaic and insular, the banks here are not really geared up for dealing with foreign currencies. If you can manage it, it will probably be much easier to get traveller's cheques in dollars at your end than to cash Sterling traveller's cheques here. You will probably get a better rate of exchange by getting U.S. dollar traveller's cheques over there, also. Most commercial places here will accept credit cards from British banks that are affiliated with the major international issuers (e.g. VISA, MasterCard), and credit card charges always get fair exchange rates. You'll probably have no problem paying your way with a credit card in restaurants here, or for example if you take a day off to go sightseeing in Washington. But for everyday needs such as groceries, etc. you'll find that not all stores will take plastic and some cash will be necessary.

If the cash situation gets tight while you're here, I can of course tide you over any emergency and we could sort out the details later. But if you can bring what you think you'll need as $ traveller's cheques it will be the least hassle for you and one of the best exchange rates, too.

That's all I can think of for now. I'll be here in C'ville all of next week, so it should be easy to stay in contact if you have any questions about anything to do with the visit.

Best wishes, Alan B.

From root Sat Nov 21 10:34:05 1992
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
["690" "Sat" "21" "November" "92" "15:33:56" "GMT" "PAGS@phx.cam.ac.uk"
"PAGS@phx.cam.ac.uk" nil "12" "Re: [Calibration]" "^From:" nil nil "11"])
Received: from gray.csi.cam.ac.uk by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
id AA15014; Sat, 21 Nov 92 10:34:03 -0500
Received: from phx.cam.ac.uk by ppsw1.cam.ac.uk
with NIFTP (PP-6.0) Cambridge as ppsw.cam.ac.uk
id <28826-0@ppsw1.cam.ac.uk>; Sat, 21 Nov 1992 15:34:01 +0000
Message-Id: <A6A0BB7367370830@UK.AC.CAMBRIDGE.PHOENIX>
In-Reply-To: <9211101902.AA22030@polaris.cv.nrao.edu>
From: PAGS@phx.cam.ac.uk
To: (Alan Bridle) abridle <abridle@polaris.cv.nrao.edu>
Subject: Re: [Calibration]
Date: Sat, 21 Nov 92 15:33:56 GMT

Dear Alan, many thanks for your email messages. My view is now that the absolute top priority is to get as far with the analysis as possible, i.e. start from where you have got to. I know that's not quite what I said before. I will try once more to contact Stephen Turner before he leaves and relay your note about paying NRAO before departure from Greenbank.

Polarization: it seems to me that this has lower priority than spectral index. Much lower. The percentage polarizations are of some interest for the project; I see no immediate use for the RMs, except for reassurance that everything else is going well. What do you think?

Cheers, and good luck. Peter

From root Mon Nov 23 12:57:06 1992
X-VM-v5-Data: ([nil nil nil nil t nil nil nil nil]
      ["84" "Mon" "23" "November" "92" "10:57:06" "MST" "Theresa McBride"
"tmcbride@aoc.nrao.edu" "<9211231757.AA23177@lebeau.aoc.nrao.edu>" "8" "Re: VLA
user number for Stephen Turner" "^From:" nil nil "11"])
Received: from Lebeau.aoc.nrao.edu by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
          id AA28215; Mon, 23 Nov 92 12:57:06 -0500
Received: by lebeau.aoc.nrao.edu (4.1/1.3pmg)
      id AA23177; Mon, 23 Nov 92 10:57:06 MST
Message-Id: <9211231757.AA23177@lebeau.aoc.nrao.edu>
From: Theresa McBride <tmcbride@aoc.nrao.edu>
To: abridle@polaris.cv.nrao.edu
Subject: Re: VLA user number for Stephen Turner
Date: Mon, 23 Nov 92 10:57:06 MST

Hi Alan,
   I've assigned Aips/User number 1871hto Stephen Turner.

Bye.

Theresa

From abridle Mon Nov 30 11:30:01 1992
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
      ["1539" "Mon" "30" "November" "92" "11:29:32" "-0500" "Alan Bridle" "abridle
" nil "33" "Progress" "^From:" nil nil "11"])
Received: by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
          id AA32146; Mon, 30 Nov 92 11:29:32 -0500
Message-Id: <9211301629.AA32146@polaris.cv.nrao.edu>
From: abridle (Alan Bridle)
To: pags@phx.cam.ac.uk
Subject: Progress
Date: Mon, 30 Nov 92 11:29:32 -0500

Dear Peter,

Just to let you know that Stephen has settled in pretty well and we are making quite good progress with reducing the L Band data. I don't think we will be able to reach the noise on these images because of the limited u,v coverage, but in most cases we will be able to get down to about 2 or three times the noise. 3C175, 3C336 and 3C432 are reasonably "done" at L Band already and I have taken Stephen through the exercise of aligning and regridding the 3C175 LBand and CBand images to make a spectral index image. 3C263 is proving a harder nut to crack because of the very bright hot spot and I am about to introduce him to the nysteries of composite CLEAN and MEM deconvolution. I believe this will definitely qualify as "black art" in your book.

He's coping pretty well with the unfamiliar surroundings, especially given the recent problems he has had at home. It may also be good for him that he's been able to talk a bit about his career plans with Mary and with one of our friends who is a pediatrician.

I think there's a good chance that he will return with the data reduction in pretty good shape without him having to burn the candle at both ends too hard while he's here.

In case you haven't heard directly from Robert (!), he's going to be over here for about the last 10 days of Stephen's visit -- they will both be going back to the U.K. on Dec.21st, maybe even on the same plane. I'm very hopeful that we'll know the basic answer to our questions by the time they come back.

Best wishes,

Alan

From abridle Tue Dec 1 13:22:44 1992
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
      ["813" "Tue" "1" "December" "92" "13:21:59" "-0500" "Alan Bridle" "abridle "
nil "19" "Re: Flights" "^From:" nil nil "12"])
Received: by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
          id AA17785; Tue, 1 Dec 92 13:21:59 -0500
Message-Id: <9212011821.AA17785@polaris.cv.nrao.edu>
References: <9212011721.AA27970@polaris.cv.nrao.edu>
From: abridle (Alan Bridle)
To: "Robert Laing, RGO, Cambridge" <"CAVAD::RL"@STARLINK.ASTRONOMY.CAMBRIDGE.AC.UK>
Subject: Re: Flights
Date: Tue, 1 Dec 92 13:21:59 -0500

Sounds good, I'll plan to meet
 you at C'ville airport on the
11th at 5 pm.

We are making quite good progress with the data reduction, though it
does not look as through we will reach the noise limit on these
sources, and 3C263 has deconvolution (not calibration) problems with
the exceptionally bright hot spot in the South-East lobe. We have
made a reasonable image with a compisite CLEAN/MEM deconvolution
and will probably need to go back to the 6cm data to repair it the
same way. 3C175 and 3C336 are in good shape, 3C432 is of course
a bit small to be very interesting.

We have left 3C334 to the last, and will probably start in on its
self-calibration today. Stephen is picking things up quite well
considering how much there has been for him to assimilate at once.

Have a good trip to Germany,

A.

From root Tue Dec 1 14:21:07 1992
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
      ["932" "Tue" "1" "December" "92" "18:34" "GMT" "\"Robert Laing, RGO,
Cambridge\"" "RL@STARLINK.ASTRONOMY.CAMBRIDGE.AC.UK" nil "19" "Data reduction"
"^From:" nil nil "12"])
Received: from sun2.nsfnet-relay.ac.uk by polaris.cv.nrao.edu (AIX 3.1/UCB
5.61/1.0)
          id AA36300; Tue, 1 Dec 92 14:21:02 -0500
Message-Id: <9212011921.AA36300@polaris.cv.nrao.edu>
Via: uk.ac.cambridge.astronomy.starlink; Tue, 1 Dec 1992 18:44:47 +0000
From: "Robert Laing, RGO, Cambridge" <RL@STARLINK.ASTRONOMY.CAMBRIDGE.AC.UK>
To: ABRIDLE <ABRIDLE@polaris.cv.nrao.edu>
Subject: Data reduction
Date: Tue, 1 Dec 92 18:34 GMT

A belated answer to y
ur queries about polarization:

- I would be surprised if we learned a great deal about the rotation
measure distributions, since the linear resolution is poor and we only
have the two frequencies. This wasn't the main aim.

- We might get rather more from the depolarization maps, along the lines
of Fernini et al.'s work on 3C 47. 3C 334 was looked at by Simon Garrington,
but at lower resolution than in our observations. It would be interesting
to see whether the depolarization appears to be uncorrelated with the
total intensity distribution, as in 3C 47.

It would be worth going to a certain amount of trouble to assure ourselves
that the degree of polarization was not being badly messed up by LR
phase difference fluctuations, if necessary by mapping subsets of the data
and comparing position angles. The absolute value of the PA is of less
interest, I think.

See you on 11th, Regards, Robert

From abridle Wed Dec 16 12:28:02 1992
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]

["2116" "Wed" "16" "December" "92" "12:27:39" "-0500" "Alan Bridle" "abridle
" nil "42" "AL270 progress" "^From:" nil nil "12"])
Received: by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
          id AA04040; Wed, 16 Dec 92 12:27:39 -0500
Message-Id: <9212161727.AA04040@polaris.cv.nrao.edu>
From: abridle (Alan Bridle)
To: pags@phx.cam.ac.uk
Subject: AL270 progress
Date: Wed, 16 Dec 92 12:27:39 -0500

Hello Peter,

Just to let you know that Robert is now here and Stephen is back from his trip to New York, so we are all making a big push on the AL270 reductions this week. While Stephen was away, Robert and I experimented with various ways of analyzing the spectral index data. It turns out that plotting the spectral index against the surface brightness over each of the lobes leads to some revealing plots that help to bring out some of the more subtle differences between the lobes (without explicitly including information about feature shapes). These plots tell only part of the story, to be sure, but we believe they will be helpful in assessing some of the systematic inter-lobe differences.

As Stephen told you, we find relatively strong asymmetries in two objects, and weaker asymmetries in all of the others. 3C263 has a strong asymmetry that is the reverse of the Liu/Pooley effect. There is also some evidence that features that we believed to parts of the counterjets indeed have flatter spectra than other features in their lobes. This increases the likelihood that these features are indeed counterjet-related.

I now have some better news about the polarization data. Some sleuthing yesterday revealed that two different AIPS programmers were hacking in the polarization-calibration code while I was trying to calibrate our data. (I work with code in the AIPS "construction zone" to help them catch bugs early on before they escape to the non-NRAO users). In this case it now appears that most of the "ionosphere" I was encountering was in fact an AIPSosphere, probably caused by some misguided "improvements" made to the code just when I was using it. Using an older un-hacked-on version of the calibration code appears to have eliminated most of the L-R phase variation and has given me a much more sensible set of results. Confirmation of this to follow, but I now believe that we will after all be able to look at the depolarization and rotation reliably with this data set. Given the unexpected spectral asymmetry in 3C263, this is particularly good news.

More later,

Regards, Alan

From abridle Thu Dec 17 10:27:27 1992
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
["434" "Thu" "17" "December" "92" "10:27:02" "-0500" "Alan Bridle" "abridle "
nil "13" "MERLIN proposal" "^From:" nil nil "12"])
Received: by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
id AA27005; Thu, 17 Dec 92 10:27:02 -0500
Message-Id: <9212171527.AA27005@polaris.cv.nrao.edu>
From: abridle (Alan Bridle)
To: pags@pho.cam.ac.uk
Subject: MERLIN proposal
Date: Thu, 17 Dec 92 1-:27:02 -0500

Hello Peter,

Some aspects of our strategy for the next few days could be influenced by the fate of the MERLIN L Band proposal for 3C208 and 3C432. (If this proposal was rejected, we won't bother with some of the other processing for these sources -- at least not yet).

Have you heard anything about the fate of this proposal at the MERLIN scheduling meeting last week? Could you enquire about it if not?

Thanks,

Alan and Robert

From root Fri Dec 18 07:51:11 1992
X-VM-v5-Data: ([nil nil nil nil t nil nil nil nil]
 ["1443" "Fri" "18" "December" "92" "12:50:31" "GMT" "PAGS@phx.cam.ac.uk"
"PAGS@phx.cam.ac.uk" "<A6C28B32B9CCEC90@UK.AC.CAMBRIDGE.PHOENIX>" "24" "Re: [MERLIN
proposal]" "^From:" nil nil "12"])
Received: from gray.csi.cam.ac.uk by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
 id AA29148; Fri, 18 Dec 92 07:51:04 -0500
Received: from phx.cam.ac.uk by ppsw1.cam.ac.uk
 with NIFTP (PP-6.0) Cambridge as ppsw.cam.ac.uk
 id <14954-0@ppsw1.cam.ac.uk>; Fri, 18 Dec 1992 12:50:38 +0000
Message-Id: <A6C28B32B9CCEC90@UK.AC.CAMBRIDGE.PHOENIX>
In-Reply-To: <9212171527.AA27005@polaris.cv.nrao.edu>
From: PAGS@phx.cam.ac.uk
To: (Alan Bridle) abridle <abridle@polaris.cv.nrao.edu>
Subject: Re: [MERLIN proposal]
Date: Fri, 18 Dec 92 12:50:31 GMT

Dear Alan and Stephen and Robert...

I had no news of the MERLIN proposal, so I 'phoned. The news is that the same three sources as ours are in a Jodrell proposal, also PhD-related, and Rod Davies will sort this out with us somehow. The chances seemed to be that the sources will be observed and both sets of applicants will be allowed to use the data, as it's part of a bigger data set in each case, but clearly there is some 'conflict of interest' and nothing is certain till I hear from Rod.

A few queries, meanwhile. 1. Is the asymmetry the reverse of Liu-Pooley in each case, or only in some cases? 2. Is there any indication yet that the asymmetry is due to any identifiable part of the lobe, like front end, back end, inside, outside? What you said about experiments with spectral index vs. brightness plots suggests that you've given a lot of thought to that question already. 3. Congratulations on identifying AIPSospheric rotation - that looks like good news indeed. 4. If the answer to 1. is yes, the asymmmetry is flat-spectrum=counterjet-side in all cases, then that adds extra point to 2., because Garrington/Leahy/Conway found a weak correlation in the other sense for quasars, i.e. the "expected" sense on the basis of Liu-Pooley, tho' they said it might all be due to hot-spots, not lobes. A Again, I'll try to remember to check whether any of our sources are in their list.

Cheers Peter

From abridle Fri Dec 18 10:47:12 1992
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
["2159" "Fri" "18" "December" "92" "10:46:57" "-0500" "Alan Bridle" "abridle
" nil "43" "Re: [MERLIN proposal]" "^From:" nil nil "12"])
Received: by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
id AA24831; Fri, 18 Dec 92 10:46:57 -0500
Message-Id: <9212181546.AA24831@polaris.cv.nrao.edu>
References: <9212171527.AA27005@polaris.cv.nrao.edu>
<A6C28B32B9CCEC90@UK.AC.CAMBRIDGE.PHOENIX>
From: abridle (Alan Bridle)
To: PAGS@phx.cam.ac.uk
Subject: Re: [MERLIN proposal]
Date: Fri, 18 Dec 92 10:46:57 -0500

Thanks for the MERLIN info, this was much as Robert had expected.

Just to clarify point 1: of the well-resolved sources (3C174, 204, 249.1, 263, 334, 336 and 351) in our list, only 3C263 has a clear asymmetry in which the spectral index is flatter over a significant area of the "counterjetted" lobe than it is over a similar area of the jetted lobe. (It is as if most of the emission in 3C263's counterjet lobe is an "extended hot spot"). The spectral asymmetries in the other sources are generally smaller, and in the general sense of the Liu/Pooley result. The main qualification that has to be made for the others is that the spectral-index versus brightness plots demonstrate that statements about the more subtle asymmetries need an accompaniment of statements about which areas of the source have been compared, and why -- e.g. one tight get rather different results by comparing regions of similar surface brightness (regardless of their apparent area or location within the two lobes) than one would by comparing regions of similar area selected for particular geometrical relationship to the core or to the hot spots). We are still experimenting with index-brightness plots that dissect out the potentially beamed emission such as jets, counterjets, hot spot "splatters" etc. so the answer to your second point is really "questions being asked, work in progress, detailed answers later".

At the moment we are concentrating on making the very best (well-aligned, zero-corrected) spectral index images for Stephen to return with, and on processing the polarization data fully. Our goal is for Stephen to return with only image-plane analysis in his future (though a tape with all of the relevant calibrated uv data sets (20cm and 6cm) will also be returning with him in case further imaging is useful -- for some of the most diffuse lobe emission, it may be useful also to make images at about 2" resolution, for example). The questions about what regions to compare, and how, may need extensive discussion. But the total and polarized intensity images themselves should be in good shape when Stephen returns to Cambridge.

Cheers

Alan

From abridle Mon Dec 21 10:05:53 1992

X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
      ["1615" "Mon" "21" "December" "92" "10:05:39" "-0500" "Alan Bridle" "abridle
" nil "39" "3C263 " "^From:" nil nil "12"])
Received: by polaris.cv.nrao.edu (AIX 3.1/UCB 5.61/1.0)
          id AA20124; Mon, 21 Dec 92 10:05:39 -0500
Message-Id: <9212211505.AA20124@polaris.cv.nrao.edu>
From: abridle (Alan Bridle)
To: pags@phx.cam.ac.uk
Subject: 3C263
Date: Mon, 21 Dec 92 10:05:39 -0500

Dear Peter,

We have now processed most of the polarization/depolarization data,
and have the result for 3C263. The source becomes even more
interesting! Leaving aside the very bright hot spot, which is
apparently repolarized at 20 cm (probably by the spectral index
gradient effect), it seems that the depolarization asymmetry in this
source is *also* "the wrong way round". That is, the extended
emission on the counterjet side depolarizes very little between 6cm
and 20cm, while that on the jet side depolarizes significantly.

Thus *both* the spectral asymmetry and the depolarization asymmetry are
"backwards".

It may be significant that this source has a rather large
ratio of arm lengths, with the jet, the depolarization, and
the steeper spectrum all being on the "short" side. Possibly
this is a case in which an intrinsic asymmetry has managed to
overwhelm the apparent ones even in a QSR that is well enough
aligned to be a VLBI superluminal?

Robert and Stephen both depart later today. We had a good session
with Stephen yesterday about what this might all mean, and gave
him a few ideas about how one might package this for his M.Sc.
thesis. He seems a little bemused by it all but then so are we!

I think we have some interesting results here that may point to
an amusing mixture of reasons for different asymmetries in the
RGs and the QSRs, and suggest that it may be particularly well worth
examining the spectral index and depolarization asymmetries in
other QSRs with large ratios of arm length in the radio.

Much more later, I'm sure ...

Meanwhile, Merry Christmas!

regards, Alan

From root Tue Feb 16 14:29:09 1993
X-VM-v5-Data: ([nil nil nil nil t nil nil nil nil]
["1648" "Tue" "16" "February" "93" "19:28:47" "GMT" "ST115@phx.cam.ac.uk"
"ST115@phx.cam.ac.uk" "<A70E541F2728BC10@UK.AC.CAMBRIDGE.PHOENIX>" "42" "Re:
Visiting Charlottesville" "^From:" nil nil "2"])
Received: from gray.csi.cam.ac.uk by polaris.cv.nrao.edu (AIX 3.2/UCB 5.64/4.03)
id AA17718; Tue, 16 Feb 1993 14:29:08 -0500
Received: from phx.cam.ac.uk by ppsw1.cam.ac.uk
with GB-CAM (PP-6.0) as ppsw.cam.ac.uk id <03617-1@ppsw1.cam.ac.uk>;
Tue, 16 Feb 1993 19:28:58 +0000
Message-Id: <A70E541F2728BC10@UK.AC.CAMBRIDGE.PHOENIX>
In-Reply-To: <9211172212.AA26848@polarcs.cv.nrao.edu>
From: ST115@phx.cam.ac.uk
To: (Alan Bridle) abridle <abridle@polaris.cv.nrao.edu>
Subject: Re: Visiting Charlottesville
Date: Tue, 16 Feb 93 19:28:47 GMT

Mullard Radio Astronomy Observatory
Cambridge

Dear Alan,

Best wishes for the New Year to yourself and Mary.

Many thanks for that breathtaking phone bill: I sent you some cash in the post to cover it (with some trepidation, I admit) - did you receive it OK and settle the bill?

Data reduction work on our sources has continued here and, at Robert's suggestion, I have been following this recipe in an attempt to determine the contribution of the hotspot flux to the mean spectral index of the emission from each of the lobes:

1/ Generate IMVIM plots of intensity vs. spectral index for all of the sources at both bands.
2/ Generate new maps at L band where pixels with intensity above or below given "clip" levels are blanked
3/ Blank out the same pixels on the C band image
4/ Generate spectral index maps using these two clipped maps
5/ Work out the area weighted mean spectral index over each of the lobes

Naturally, the peaks in the IMVIM plots correspond to the hotspots (and, to a lesser extent, the core, which is blanked out anyway): by taking cuts at various upper and lower limits in intensity we can investigate the contribution of the hotspots, and develop a way of blanking out the hotspot emission which is less arbitrary than simply using task "blank".

Mary may be interested to know that I was interviewed at Edinburgh University Medical School last monday, and yesterday morning received an unconditional offer of a place, which I have accepted. Now I will have to start house hunting!

I hope that all is well with you, and that Parachute and Panjia are behaving themselves.

With very best wishes,

Stephen Turner.

From abridle Tue Feb 16 15:15:43 1993
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
["1247" "Tue" "16" "February" "1993" "15:15:36" "-0500" "Alan Bridle"
"abridle " nil "32" "Re: Visiting Charlottesville" "^From:" nil nil "2"])
Received: by polaris.cv.nrao.edu (AIX 3.2/UCB 5.64/4.03)
id AA20088; Tue, 16 Feb 1993 15:15:36 -0500
Message-Id: <9302162015.AA20088@polaris.cv.nrao.edu>
References: <9211172212.AA26848@polaris.cv.nrao.edu>
<A70E541F2728BC10@UK.AC.CAMBRIDGE.PHOENIX>
From: abridle (Alan Bridle)
To: ST115@phx.cam.ac.uk
Subject: Re: Visiting Charlottesville
Date: Tue, 16 Feb 1993 15:15:36 -0500

Hello Stephen,

The approach to removing the hot spots sounds perfectly reasonable.
We had noticed that the offsets in spectral index between the
"spikes" and the rest of the IMVIM plots were not always the
same, and it will be interesting to see if those differences
correspond to any other recognizable features of the hot spots.

Are you doing these tests on images that have the jets blanked out?
It will not be possible to blank the jets by intensity in most
cases, so I think they may still have to be removed by using
a purely spatial filter -- i.e. by applying BLANK by eye.

Your cash was safely received and I passed it directly on to
the NRAO accounting department. They have given me a receipt --
do you need that for your accounting over there? If so, I
will forward it to you.

Glad to hear you have been accepted at Edinburgh, that must
be very satisfying for you. When will you begin there?

Mary and the cats are enjoying life as usual, all three
somewhat inhibited in their outdoor activities by several recent
snowfalls, but I think the end of our winter is only just around
the corner now.

Good to hear from you again, I'll be interested to know how the
dissection of the lobes (lobotomy?) proceeds!

Best wishes,

Alan

From root Tue Jul 13 09:07:30 1993
X-VM-v5-Data: ([nil nil nil nil t nil nil nil nil]
["2742" "Tue" "13" "July" "93" "14:06:58" "BST" "ST115@phx.cam.ac.uk"
"ST115@phx.cam.ac.uk" "<A7C6DE5BE2E58460@UK.AC.CAMBRIDGE.PHOENIX>" "54" "Asymmetric
sources" "^From:" nil nil "7"])
Received: from gray.csi.cam.ac.uk by polaris.cv.nrao.edu (AIX 3.2/UCB 5.64/4.03)
id AA29315; Tue, 13 Jul 1993 09:07:26 -0400
Received: from phx.cam.ac.uk by ppsw1.cam.ac.uk
with GB-CAM (PP-6.0) as ppsw.cam.ac.uk id <09452-0@ppsw1.cam.ac.uk>;
Tue, 13 Jul 1993 14:07:18 +0100
Message-Id: <A7C6DE5BE2E58460@UK.AC.CAMBRIDGE.PHOENIX>
From: ST115@phx.cam.ac.uk
To: abridle@polaris.cv.nrao.edu
Subject: Asymmetric sources
Date: Tue, 13 Jul 93 14:06:58 BST

Dear Alan,

I hope that all is well with you. I am in the process of writing up my MSc thesis, and wonder if you could help and remind me of one or two things regarding the data reduction of the eight sources which we processed during my visit there last november/december. Firstly, however, you might be interested in my main results:

In three sources out of the sample of eight (3C334, 3C336 & 3C204) the spectral index asymmetry shown by the lobes is the reverse of that shown by the hotspots. As we discovered when we were together, the spectral index asymmetry shown by 3C263 is the reverse of that which we would expect in thinking that the jet side is usually flatter: this remains the case quite pronouncedly down to low surface brightness levels. It is interesting to note that the two sources which do not follow the Laing-Garrington correlation (3C204 & 3C263) also have flatter jet-side spectrum in the extended emission regions (although in the case of 3C204, not in the hotspots). When we plot a graph of the difference in lobe spectral index against log (dj/dcj) (where dj & dcj are the jet and counterjet side arm lengths) we discover a fairly clear correlation between the side with steeper spectrum in the extended emission regions, and the side with shorter arm. This would indicate that the arm length asymmetries are being caused by differences in the density of the gas surrounding the source, and that the extended emission from the lobes is steeper on the shorter arm side as the synchrotron electrons on that side are undergoing greater losses
- possibly due to adiabatic expansion, or maybe
because the magnetic field in that lobe is more random.

My questions are as follows:

1/ Why is there no polarization data for 3C432? Rob Laing says that it was because no instrument calibration was done during the observation of that source. Can you be more specific?

2/ What was the beam when the sources were observed? At L and C band, the sources have been mapped with a circular beam: FWHM=1.3" approx for L, 0.33" or thereabouts for C. But was this the FWHM of the convolving beam, or was it the FWHM of the true VLA beam during the observation - which is, I think, usually elliptical?

3/ Was any optical counterpart ever found for the source to the northwest of 3C334 which was in line with the jet? Guy Pooley and I had a mooch through

the optical plates here and could find nothing corresponding to the position of that source. Perhaps you have access to a deeper sky survey?

4/ Is there anything else about the part of the calibration which was done before my arrival at NRAO which I should know about?

Give my best wishes to Mary and the cats. Are they all well?

Yours,
with best wishes,

Stephen Turner.

From abridle Tue Jul 13 10:06:42 1993
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
["6250" "Tue" "13" "July" "1993" "10:06:25" "-0400" "Alan Bridle" "abridle "
nil "116" "Re: Asymmetric sources" "^From:" nil nil "7"])
Received: by polaris.cv.nrao.edu (AIX 3.2/UCB 5.64/4.03)
id AA29607; Tue, 13 Jul 1993 10:06:25 -0400
Message-Id: <9307131406.AA29607@polaris.cv.nrao.edu>
References: <A7C6DE5BE2E58460@UK.AC.CAMBRIDGE.PHOENIX>
From: abridle (Alan Bridle)
To: ST115@phx.cam.ac.uk
Subject: Re: Asymmetric sources
Date: Tue, 13 Jul 1993 10:06:25 -0400

Hello Stephen,

Good to hear from you again, and that there are some good systematics to the asymmetries (Peter and Robert have also been telling me a little about this as you've been going along). It sounds as though you will have a tidy package for your thesis.

Can you elaborate on your idea that the field might be more random in one lobe than in the other? What could cause this?

Re your specific questions:

1. 3C432 was not observed on the same day as the others, but had a separate, short, run. This means there was not the same "throw" in parallactic angle with which to solve for the instrumental polarization corrections. Furthermore, Robert used a wider bandwidth for these observations because the source is smaller, and because he thought we could get the instrumental terms for that bandwidth from a VLA library file. Unfortunately, that procedure was no longer being done at the VLA and no such file exists. The different bandwidth also means that we can't just use the instrumental calibration from the first day (the polarization terms are bandwidth dependent). So basically we have to run 3C432 polarization images without making the instrumental correction. This is not too serious to first order (e.g. for deciding the depolarization asymmetry) so you could make polarization images from the data set on Robert's tape and see how they look (the position angle calibration was done for these in the usual way). At the time, Robert and I did not bother with the 3C432 polarization images because Peter didn't think the polarimetry would be part of your thesis and because we also felt that we would need to combine the VLA data for this source with higher-resolution MERLIN data to make much sense of them in any case.

2. The final beamsizes are those of the circular CLEAN restoring beam. The original VLA beams are all a few (typically 5) per cent elliptical. If you need the numbers for them source by source and don't have them in your notes you could regenerate them very quickly by just doing an MX on the u,v data set with exactly the same cell size as before, and setting NITER=1 and BMAJ=0. This will remove just one CLEAN component and give you a meaasage with the result of the fit to the actual BMAJ and BMIN of the elliptical beam. We were looking at those at the time and taking the nearest "round number" for the restoring beam. Given that the corrections from the elliptical beam to circular are quite small for thiese sources, I doubt that it's worth the effort to re-create these numbers for the beam ellipticities. I am certain they will be <10% in all cases, and are

probably 3-4% in most.

3. 3C334's outlying "component" is not known to have an optical counterpart. We have done various sums to assess the statistical probability that it is part of 3C334 and not just a random confusing source. The angle between the mean axis of the straight part of 3C334's jet and the line joing the quasar to the outlying source is about 1 degree, it's quite a good alignment. Condon's 5-GHz source counts predict 0.0076 sources per square arc minute brighter than 2 mJy at 4.9 GHz, so the probability that one such source is found so well-aligned with a jet and so close to a 3C source is small indeed but depends on (a) how far away from the quasar you would consider such an alignment "interesting", (b) how many such axes per source you might consider "interesting" and (c) how many such sources you've looked at before finding this one. In writing up the 6cm study, we had 12 quasars to study, asserted that we could consider the alignment "interesting" if the neighbour was within 2 source diameters of the quasar (where the source diameter is defined by the obvious extended structure), and that there were four potentially interesting "axes" per source -- that of the straight jet segment, of the putative (if unseen) straight counterjet opposite to it, and those of the lines joining the quasar to each hot spot. After figuring the total area for all 12 sources in our 6cm sample on this basis, we decided that we should expect only 0.015 occurrences such as that in 3C334, i.e. it's got a 98.5% chance of being an outlying part of the source and not just a random background object.

What to do about that? In the absence of any evidence for a "bridge" of emission or other connection to the rest of 3C334, I thinn you have to say it's tantalizing but ambiguous. (How's thet for being decisive?). Another shred of evidence that it is really connected would tip the scales. But so far no such shred.

4. The main issue in the calibration for you is the flux density scale and the internal accuracy. The flux densities assumed for 3C286 were 14.87, 14.64, 14.62 and 14.40 Jy at 1418, 1465, 1468 and 1515 Mhz respectively (we have 4 freqs because of the two different badwidth settings). The accuracy of the internal calibration relative to these numbers is about 1%. For the 6cm data, we assumed 3C286 was 7.31 and 7.26 Jy at 4835 and 4885 MHz. The internal calibration relative to these numbers is again 1% or better for all data sets.

Any discrepancies between these assumptions and the true absolute scale affect the absolute values of the spectral indices you are working with, but not their variations across the sources. Your sensitivity to the spectral index asymmetries and to their correlations with other parameters is limited simply by the contributions of the noise in the images and by the effects of the u,v sampling on sensitivity to different scale sizes. These are things you can estimate directly from the data source-by-source. You will need to quote the absolute scale assumptions in your thesis, but your main results will not depend critically upon them.

Mary and the cats send their best wishes. Parachute is showing a few signs of her age (pushing 18) and we are a bit concerned about her but she's still her usual happy laid-back self despite the reminders that she's becoming something of an antique by feline standards.

When do you start med school (i.e. are you in panic mode yet?).

Cheers,

Alan

P.S. drop a line any time you have questions, I'll try to answer quickly. But we will be away from July 29 - August 16, on holiday in Canada.

From root Mon Aug 16 13:50:43 1993
X-VM-v5-Data: ([nil nil nil nil t nil nil nil nil]
["2106" "Mon" "16" "August" "93" "18:49:54" "BST" "ST115@phx.cam.ac.uk"
"ST115@phx.cam.ac.uk" "<A7F1DD045026F430@UK.AC.CAMBRIDGE.PHOENIX>" "53" "Re:
Asymmetric sources" "^From:" nil nil "8"])
Received: from gray.csi.cam.ac.uk by polaris.cv.nrao.edu (AIX 3.2/UCB 5.64/4.03)
id AA23860; Mon, 16 Aug 1993 13:50:42 -0400
Received: from phx.cam.ac.uk by ppsw1.cam.ac.uk
with GB-CAM (PP-6.0) as ppsw.cam.ac.uk id <24397-0@ppsw1.cam.ac.uk>;
Mon, 16 Aug 1993 18:50:18 +0100
Message-Id: <A7F1DD045026F430@UK.AC.CAMBRIDGE.PHOENIX>
In-Reply-To: <9307131406.AA29607@polaris.cv.nrao.edu>
From: ST115@phx.cam.ac.uk
To: (Alan Bridle) abridle <abridle@polaris.cv.nrao.edu>
Subject: Re: Asymmetric sources
Date: Mon, 16 Aug 93 18:49:54 BST

Dear Alan,

I hope you had a nice holiday, and I'm sorry that I didn't reply sooner:
I was off in Scotland for a while trying to sell the family house.

Many thanks for your Email with its extremely useful remarks. I'd be most
obliged if you could maybe make a few comments about the following
questions. Incidentally, I have FAXed to you the pages of my thesis
concerning the reduction of the data concerning our project, and I'd be
most interested in any comments which you may have.

1/ Do you know what the bandwidths and phase calibrators were for the three
sources which were not in our survey, but which were obtained from the VLA
archive? These sources were 3C204, 3C249.1 and 3C351.

2/ In your reply to my last Email, you listed the flux densities which we
assumed for 3C286 at the different frequencies. However, you say "we have
4 frequencies because of the 2 different bandwidth settings". When I checked
our original application for VLA time, however, there were THREE different
bandwidths (see my FAX; 3C334 was observed with a bandwidth of 12.5 MHz).
Am I missing something?

3/ As you mentioned in your last Email, we adjusted the CLEAN restoring
beam so as to ensure that it was circular, and not elliptical. Why do this?

4/ Why perform phase calibration before amplitude calibration?

5/ What criteria does one employ when selecting a solution interval?

The first two questions are things which I thought I should perhaps include
in my thesis, whereas the last three are more concerned with things which I
thought might come up in my oral exam. This is scheduled for 24 September,
and my examiners are Rob Laing (surprise, surprise!) and Paul Alexander. I
had been hoping for Guy Pooley as my internal, but there you go.

The final draft of my thesis should be ready by friday, ready for submission
next week. Would you like a copy?

Best regards to Mary. I move to Edinburgh on 30 September, and my new life
starts a couple of days after that. My address in Edinburgh is, incidentally:

1/2 Romero Place,
Edinburgh.

EH16.

Many thanks for your help,

Best wishes,

Stephen Turner.

From abridle Mon Aug 16 14:36:55 1993
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
      ["2795" "Mon" "16" "August" "1993" "14:36:50" "-0400" "Alan Bridle" "abridle
" nil "67" "Re: Asymmetric sources" "^From:" nil nil "8"])
Received: by polaris.cv.nrao.edu (AIX 3.2/UCB 5.64/4.03)
          id AA27127; Mon, 16 Aug 1993 14:36:50 -0400
Message-Id: <9308161836.AA27127@polaris.cv.nrao.edu>
References: <9307131406.AA29607@polaris.cv.nrao.edu>
      <A7F1DD045026F430@UK.AC.CAMBRIDGE.PHOENIX>
From: abridle (Alan Bridle)
To: ST115@phx.cam.ac.uk
Subject: Re: Asymmetric sources
Date: Mon, 16 Aug 1993 14:36:50 -0400

Hello Stephen,

Thanks for your message. We had a very pleasant holiday and
I'm just getting back into the swing of things today, my first
day back.

Re your message, no FAX of your thesis pages seems to have
emerged here. When was this sent?

To your specific questions,

1: The data for 3C204, 249.1 and 351 came not from the VLA
archive, but from Robert. I have only the info from the
header files for these, saying the observation dates were
1-Mar-82 and 11-Mar-82 and the bandwidth was 25 MHz. You'll
need to contact Robert for the calibrator info.

2: All of our first day's observing was done at 12.5 MHz,
not just 3C334. So only 3C432 was done at 50 MHz.

3: Use of circular restoring beams is largely cosmetic, to
make images easier to interpret visually (any apparent elongation
on the image is real and does not have to be visually deconvolved
with the beam -- same for contour plots).

4: Phase calibration is done first because it's more serious.
Most effects that can corrupt amplitude will corrupt phase
more seriously. Also, phase closure requires only 3 antennas
whereas amplitude closure requires four. So phase corrections
are better determined within a given array and it's best to get
them done fairly well before turning amplitude calibration
loose. (Empirically, turning on amplitude correction too soon
can lead to obviously incorrect or runaway answers, while turning
it on after lining up the phases reasonably well is usually
successful).

5: Solution interval has to be short enough to track the
atmospheric/ionospheric phase fluctuations but long enough to
get enough signal-to-noise (from the modeled flux density
within the solution time) to determine the corrections "well
enough". Quantitatively, 'well enough" depends on the required
dynamic range (see the chapter by Rick Perley in the Synthesis
Imaging Workshop for gory details). The fast-tracking and
signal-to-noise requirements may conflict if the atmosphere
or instrument are unstable and the source is weak. In such

cases, self-calibration may fail or be unsatisfactory.

For amplitude, solution intervals are often made longer than for phase because the main contributions to amplitude variations come from the (for the VLA, slowly-varying) electronics rather than from the troposphere or ionosphere. You can therefore emphasize signal-to-noise on small amplitude variations rather than for ability to follow rapid fluctuations (of which there may be none, unlike the situation for phase).

I would indeed be interested to have a copy of the thesis if it's not too much trouble, or expense, for you to get one to me.

Sounds like the timing is working out "perfectly" for you (read alternatively as "down to the wire", depending on your mental state!).

Cheers, and best wishes,

Alan

From abridle Tue Aug017 17:20:37 1993
X-VM-v5-Data: ([nil nil nil nil nil nil nil nil nil]
["2030" "Tue" "17" "August" "1993" "17:20:33" "-0400" "Alan Bridle" "abridle
" nil "43" "Re: Asymmetric sources" "^From:" nil nil "8"])
Received: by polaris.cv.nrao.edu (AIX 3.2/UCB 5.64/4.03)
id AA35687; Tue, 17 Aug 1993 17:20:33 -0400
Message-Id: <9308172120.AA35687@polaris.cv.nrao.edu>
References: <9307131406.AA29607@polaris.cv.nrao.edu>
<A7F1DD045026F430@UK.Ac.CAMBRIDGE.PHOENIX>
From: abridle (Alan Bridle)
To: ST115@phx.cam.ac.uk
Subject: Re: Asymmetric sources
Date: Tue, 17 Aug 1993 17:20:33 -0400

Hello again Stephen,

Your FAX has just appeared in my office (apparently it was
transmitted about 3 hrs ago), so here are some quick comments:

Dates and bandwidths:
3C432 was done on November 1, not October 31. All the 31 Oct
observations were at 12.5 MHz bandwidth per IF (that's 25 MHz total
bandwidth, because there were two IF's). Also, given the bandwidths,
I'm not sure it makes sense to quote the center frequencies in GHz to
4 decimal places?

General re resolution (right after Table 3.3.1):
It's a bit simplistic to imply that the VLA has a well-defined
'instrumental beamwidth" that we've somehow rounded off. Even while
making a dirty image, some decisions are taken about weighting the
data -- e.g. by choosing the size of the cells in the UV grid, and how
to count (weight) cells that contain information interpolated from
multiple visibilities, etc. Such decisions already affect the beam
shape and beam size before CLEANing or MEM, and as there are many
possible choices there is no virgin-pure "instrumental beam" to speak
of. Because of differences in the way visibilities can legitimately
be interpolated onto grids of different size, the VLA could produce
(somewhat) different beamsizes in different software packages, for
example. So I think you might be making more out of the rounding-up
business than it deserves. Probably not worth rewriting anything at
this stage, but this is a point that might get discussed at an
oral, for example!

Re AIPS, it's pretty hard to reference, but an old "Cookbook" and the
Synthesis Imaging book aren't really references for the code as you
used it. Why not just say it was the "NRAO AIPS package"? Also, as a
point of detail, we did most of the C'ville reductions on the IBMs,
not in the SUNs. That's just for the record if you really want to say
which computers were used. as the code for the IBM's is not identical
to that for the SUNs (because of different operarting systems.)

Finally, it's Steer and Dewdney, not Stern.

Otherwise, reads fine.

Alan