Fachgruppentreff 2009

Schweifereignis des Kometen 19P/Borrelly

Anfang 2009

Referent: Bernd Häusler

MPC code: B82 Maidbronn

Der Entdecker von 19P/Borrelly

Alphonse Louis Nicolas Borrelly entdeckte den Kometen am 28. Dezember 1904 mit einem 7,2 Zoll Refraktor (Kometensucher) des Observatoriums von Marseille.

Er beschrieb ihn 1–2 Bogenminuten groß mit einem kleinen, schwachen Kern.

Alphonse Louis Nicolas Borrelly
(* 6. Dezember 1842 in Roquemaure, bei Nîmes; † 28. Februar 1926)
Franz. Astronom, entdeckte 20 Planetoiden, 18 Kometen und 6 Galaxien, die im NGC aufgenommen wurden.
Ihm zu Ehren wurde der Asteroid Nr. 1539 Borrelly genannt.

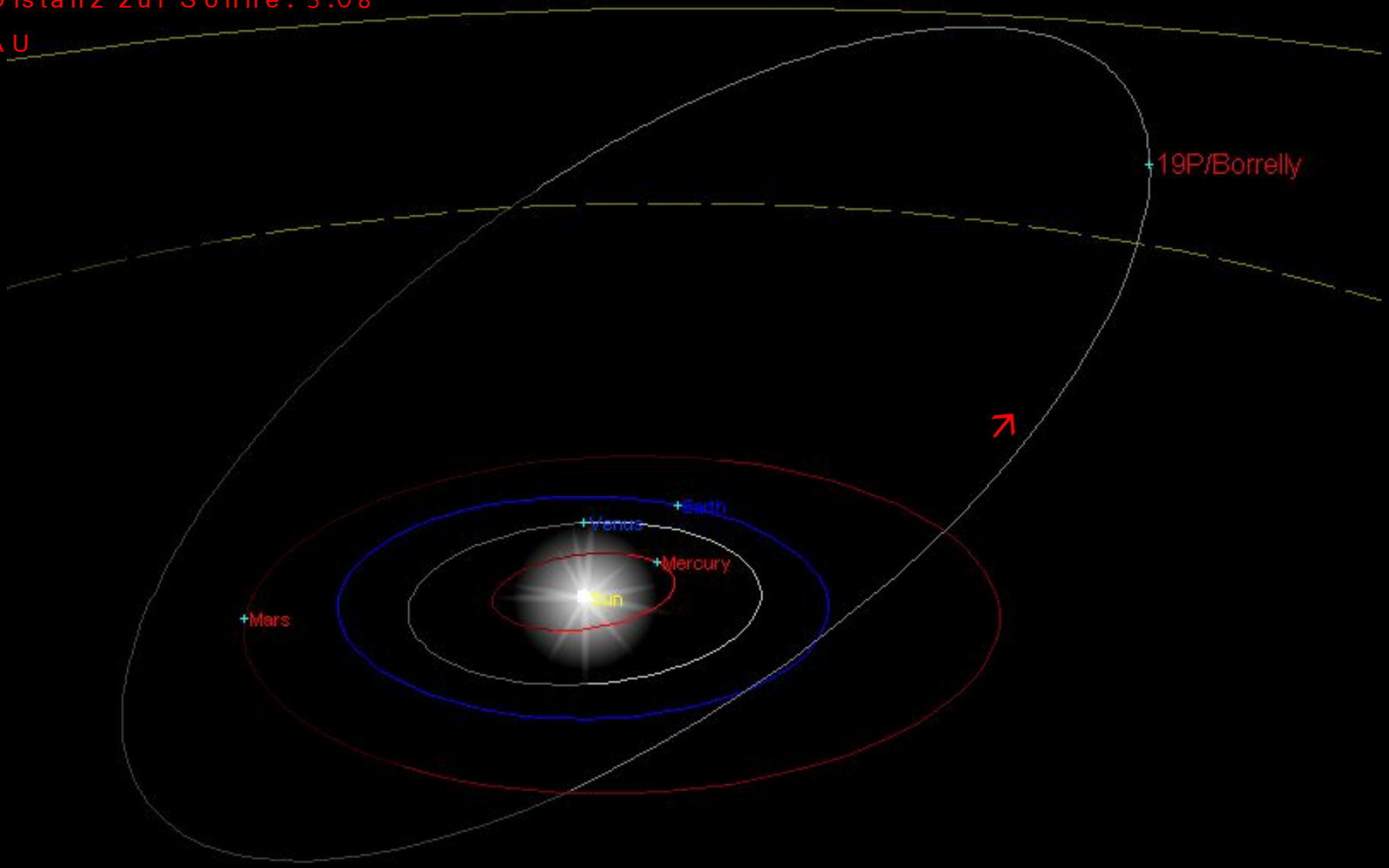
Der Komet 19P/Borrelly

Der Komet gehört zur Jupiterfamilie, zu der ca. 70 periodische Kometen zählen.

Die mittlere Apheldistanz beträgt bei dieser Kometenfamilie ca. 5,5 AU

07. Mai 2009

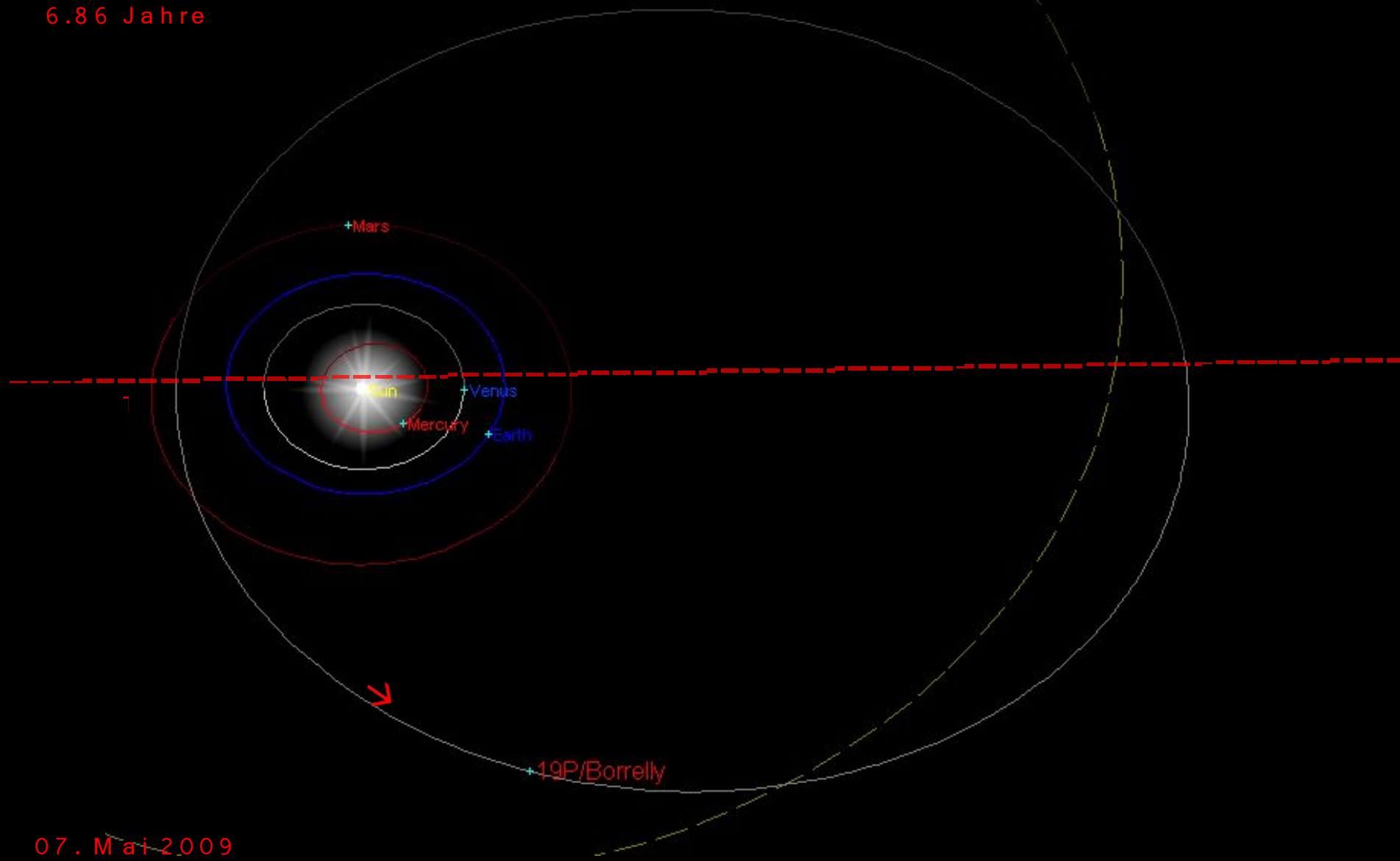
Distanz zur Sonne: 3.08 AU



19P/Borrelly auf dem Weg zu seinem Aphel im Januar 2012 in 5.86 AU Entfernung von der Sonne.

Perihel (T) am 22. Juli 2008 mit Sonnenentf. (q) = 1.35 AU)

Exzentrizität (e): 0.624482 (Ellipsenbahn) Umlaufszeit: 6.86 Jahre



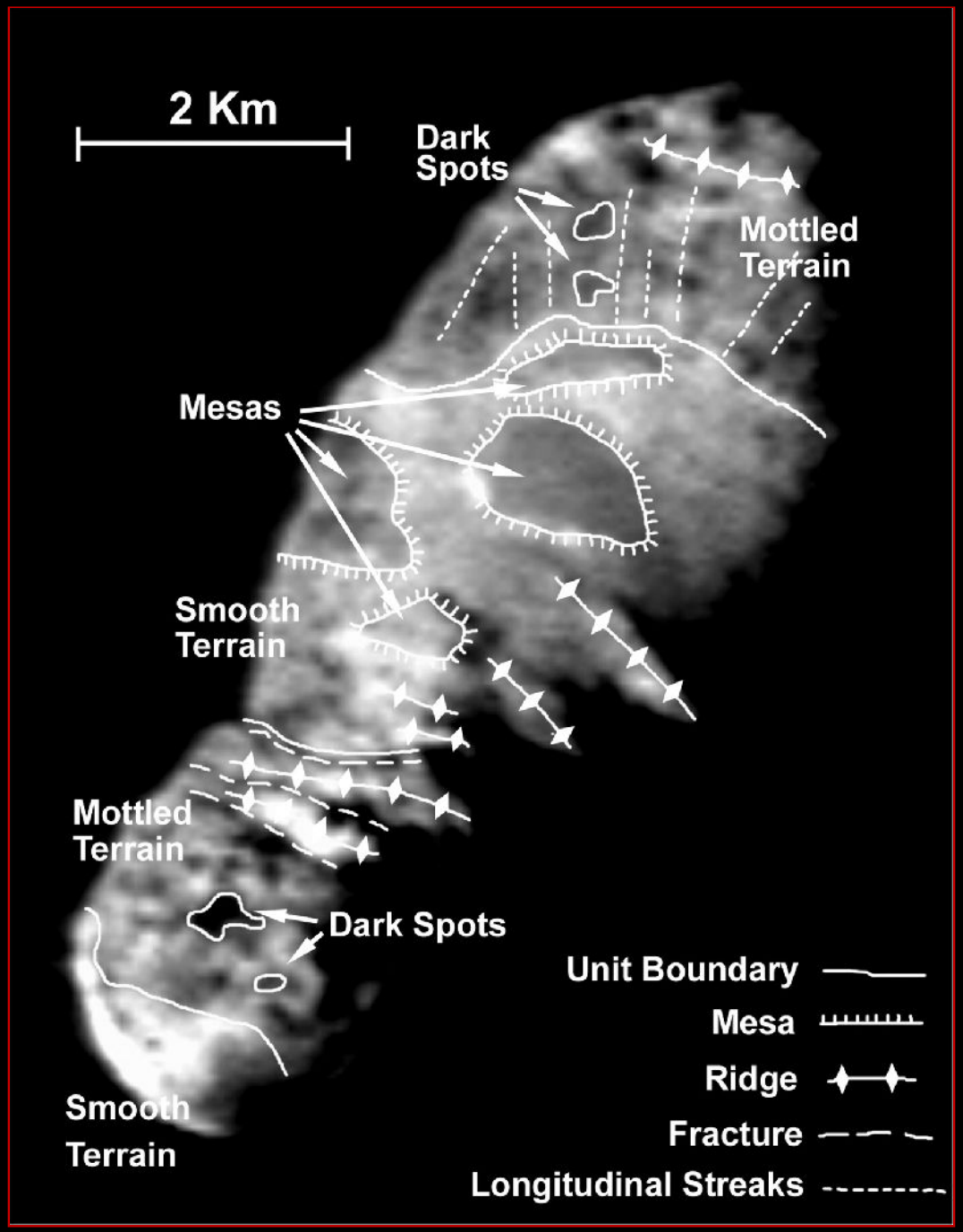
07. Mai 2009

Distanz zur Sonne: 3.08 AU

19P/Borrelly

Morphologie

← Sonne



Maße: 8 x 3 km

Umlaufszeit: ca. 26 Stunden

Aufgenommen aus ca. 3700 km Entfernung

Auflösung: ca. 50m/Pixel

Bild: Deep Space 1 NASA, JPL 2001

Nahe Umgebung des Kometenkerns

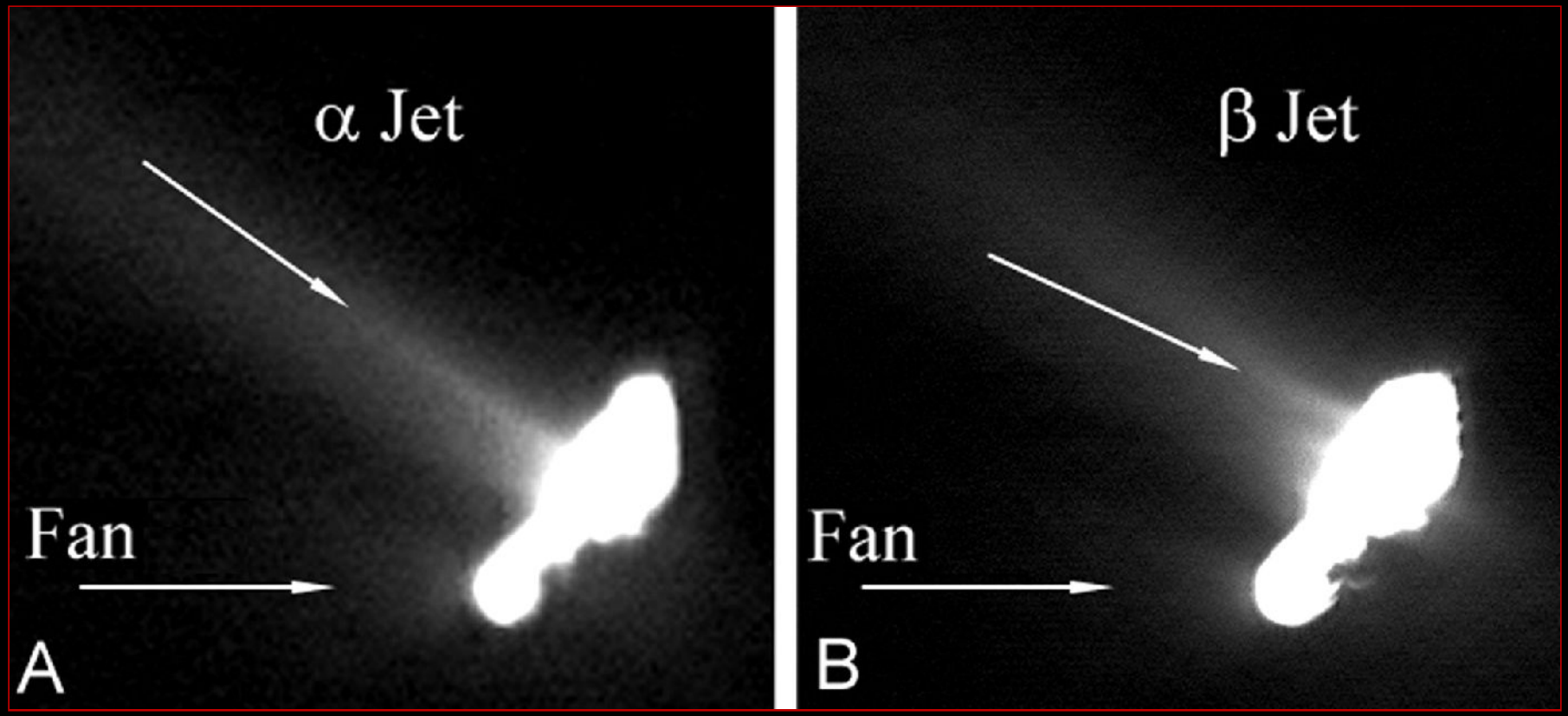


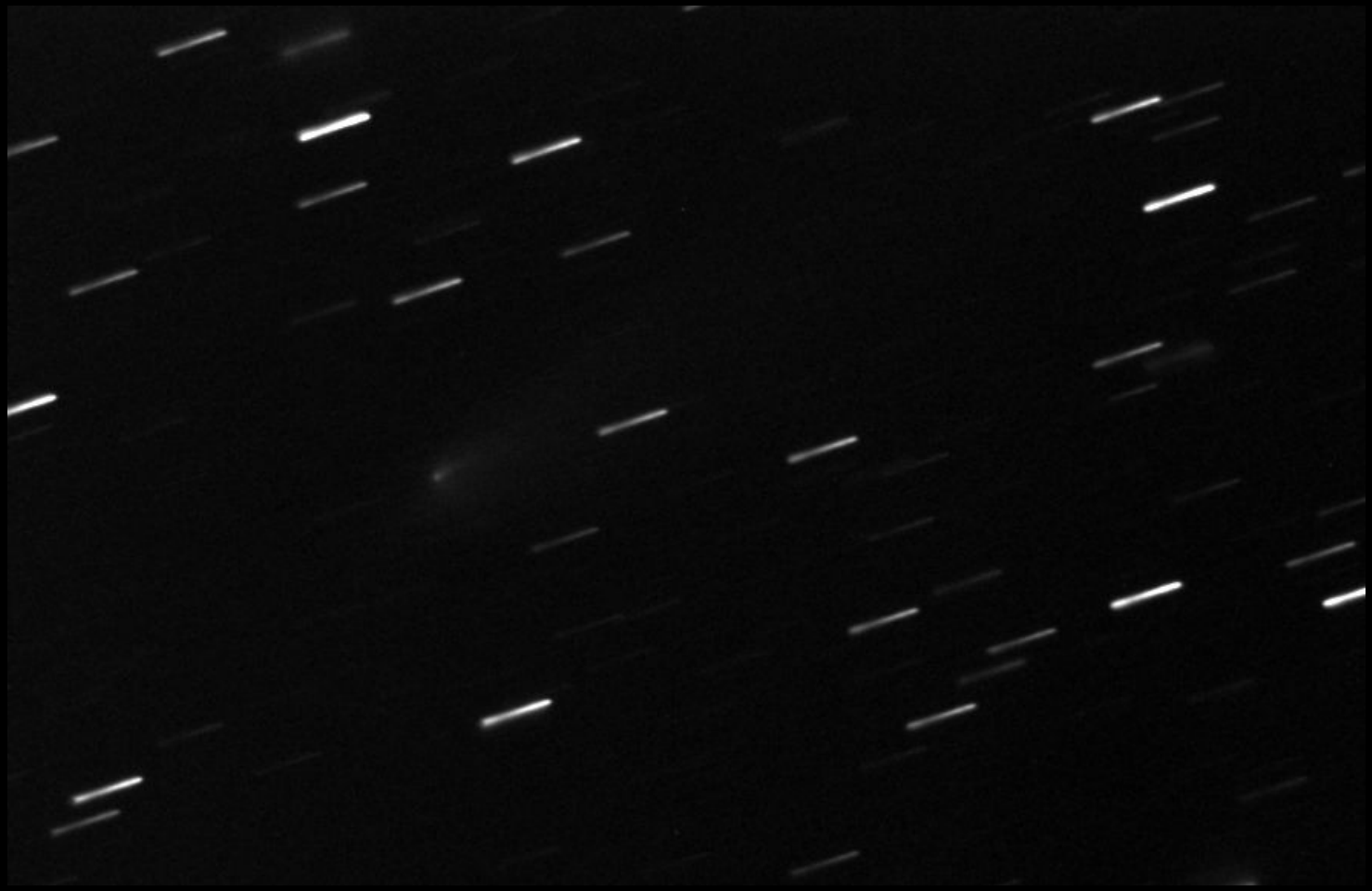
Bild:
Deep Space 1
NASA, JPL
2001

Aufgenommen aus ca. 13.130 km Entfernung
Auflösung: 173m/Pixel

2009-02-28 UT 04:16 – 05:13 54 min.exp.

16.85 mag

12“SCT f-7 + ccd ST10XME



2009-03-18 UT 02:36 – 04:10 90 min. exp.

17.11 mag

12“SCT f-7 + ccd ST10XME

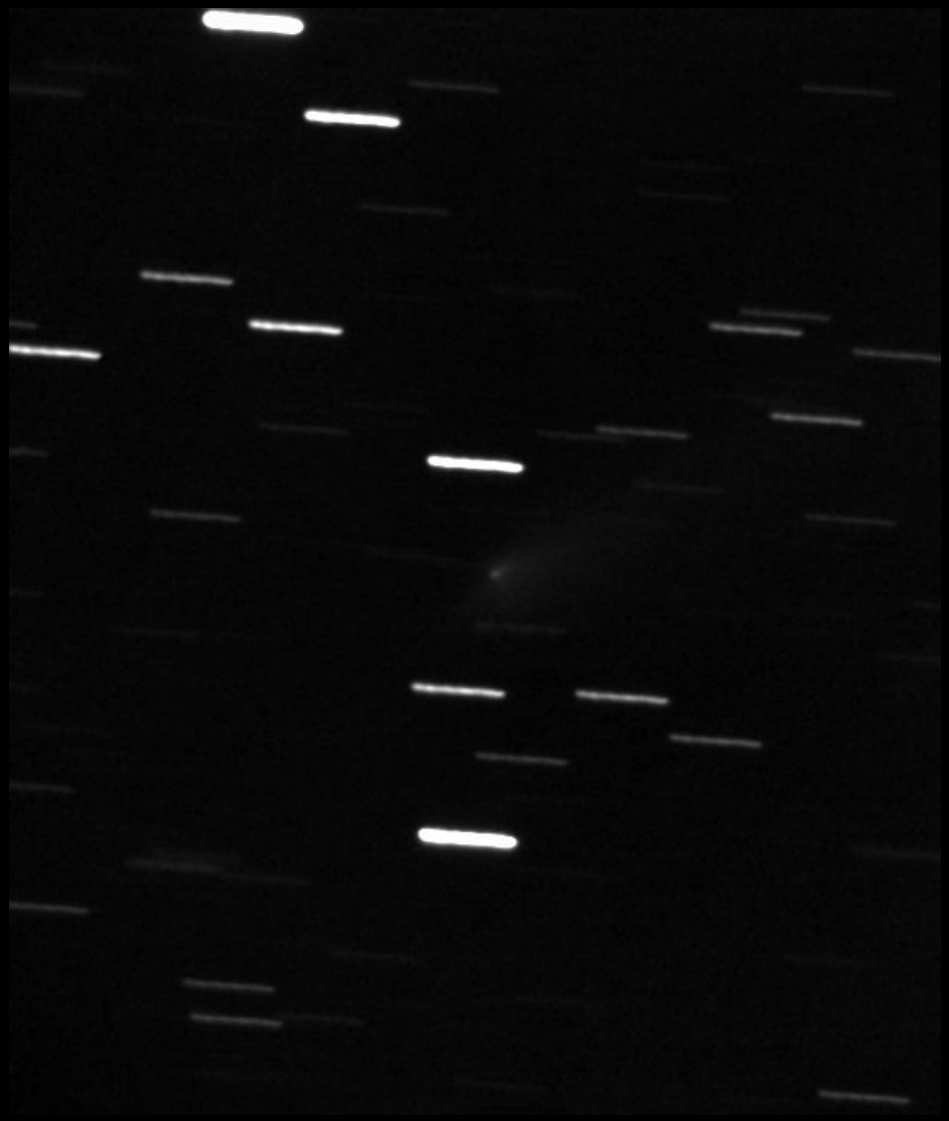
2009-03-20 UT 02:34 – 04:37 120 min.exp.
17.18 mag
12“SCT f-7 + ccd ST10XME

2009-03-21 UT 02:08 – 03:50 100 min. exp.

17.21 mag

12“ SCT f-7 + ccd ST10XME

2009-03-25 UT 01:43 – 02:49 75 min. exp.
17.13 mag
12“SCT f-7 + ccd ST10XME



2009-04-01 UT 01:41 – 03:46 123 min.exp.

17.28 mag

12“SCT f-7 + ccd ST10XME

2009-04-02 UT 02:31 – 03:33 60 min.exp.

17.25 mag

12“SCT f-7 + ccd ST10XME

2009-04-03 UT 01:08 – 02:42 90 min.exp.

17.23 mag

12“SCT f-7 + ccd ST10XME

2009-04-12 UT 00:05 – 02:42 150 min.exp.

17.50 mag

12“SCT f-7 + ccd ST10XME

2009-04-15 UT 23:38 – 01:36 111 min.exp.

17.62 mag

12“SCT f-7 + ccd ST10XME

2009-04-22 UT 23:32 – 00:01 30 min. exp.

17.72 mag

12“SCT f-7 + ccd ST10XME

2009-05-02 UT 20:01 – 20:25

24 min. exp.

Claudine Rinner, Francois Kugel and team (A77)

Observatoire Chante-Perdrix – Dauban **43°59'59" Nord 05°38'51" Est Alt. 630 mètres (N43.9997**

Aufnahme vom 07. Mai 2009

Schwierige Bedingungen:

Mond 98% in 156°, ca. 20° über Horizont

Dennoch: zweite Kondensation sichtbar

2009-05-07 UT 21:56 – 00:12 132 min. exp.

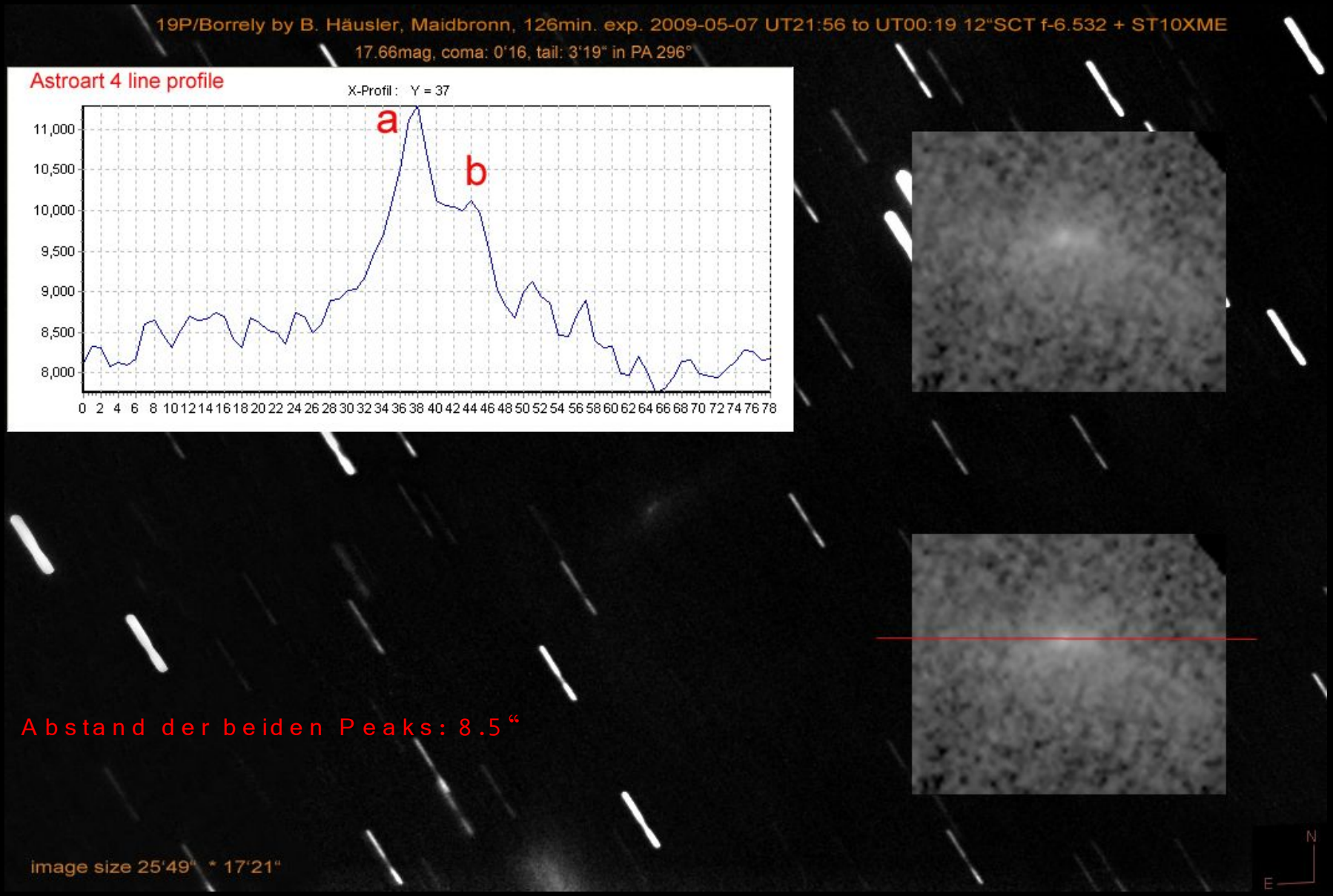
17.66 mag

12“ SCT f-6.5 + ccd ST10XME, 1.413“/pixel

2009-05-07 UT 21:56 – 00:12 132 min. exp.

17.66 mag

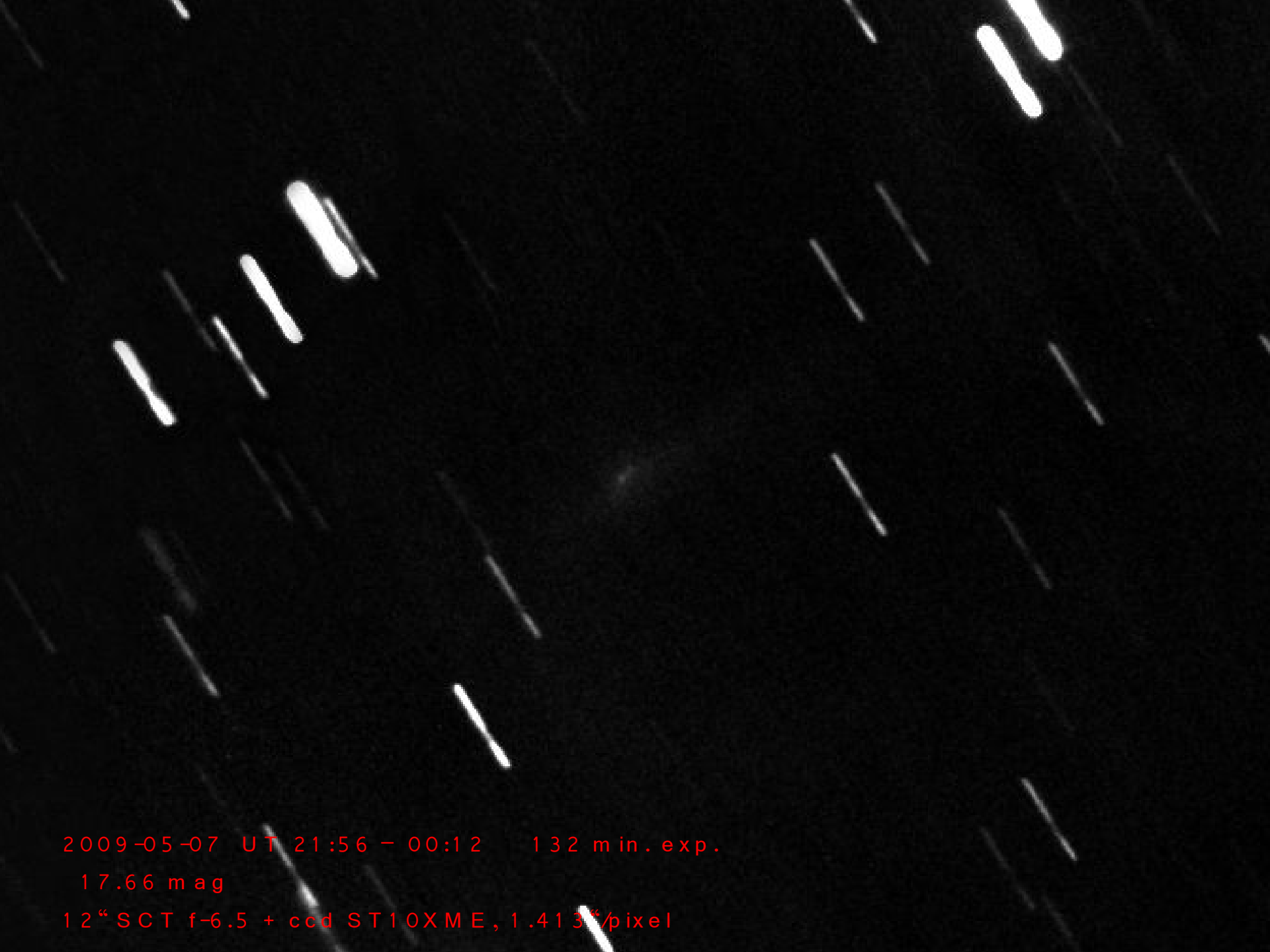
12“ SCT f-6.5 + ccd ST10XME, 1.413“/pixel



2009-05-07 UT 21:56 – 00:12 132 min. exp.

17.66 mag

12" SCT f-6.5 + ccd ST10XME, 1.413"/pixel


2009-05-07 UT 21:56 – 00:12 132 min.exp.
17.66 mag
12“SCT f-6.5 + ccd ST10XME, 1.413“/pixel

Nachfrage bei den Yahoo Gruppen Comet Images und Cometas Obs am 10. Mai 2009, nach Bestätigung auch bei comets-ml am 11. Mai 2009

Dear comet friends,

19P/Borrelly, taken under difficult conditions (Moon, summer atmosphere).
42 x 3 min. exposure, 2009-05-07, UT 21:56 to 00:19, 12" SCT f-6.532 + CCD ST10XME
17.66 mag, coma: 0'16", main tail: 3'19" in PA 296°

The central condensation seems to have a double structure this day.
May be this is a special bright dust emission in PA 310° in 13 arc seconds distance of the central condensation. The location of the second peak is laying on the well known small inner tail in PA 310, which is visible on all of my images this year.

Detailed analysis under:
http://www.amication.de/Bernhards_Comet_Project/19p_20090507.htm

Who has another picture of the comet of this day?

Clear skies
Bernhard Haeusler
MPC B82

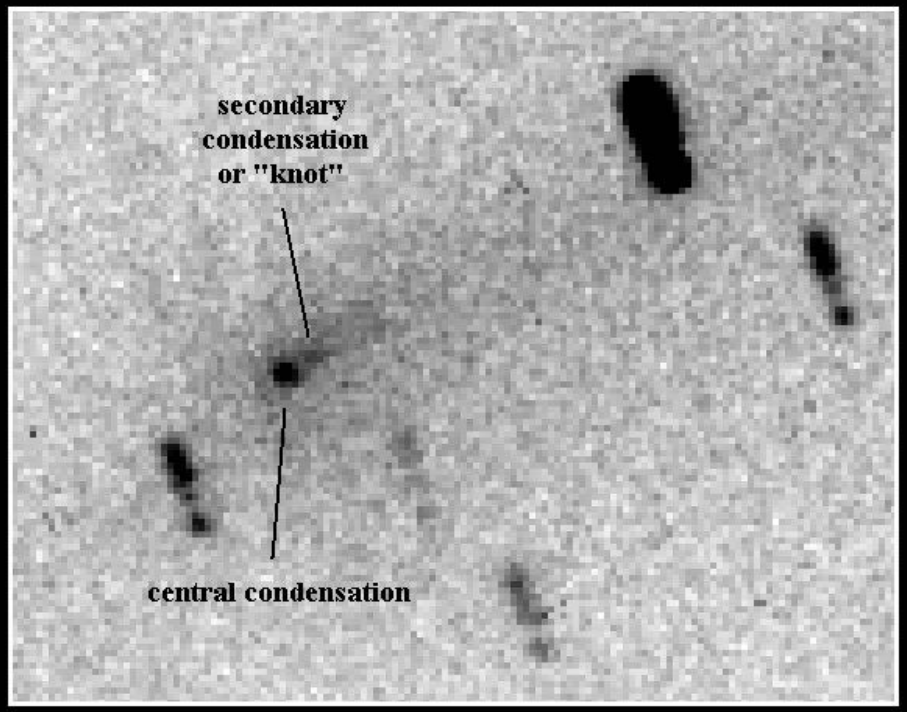
Abstand der beiden Peaks: 8“ laut email von Francois Kugel

2009-05-10.88 24 min. exp. 4-fach vergrößert

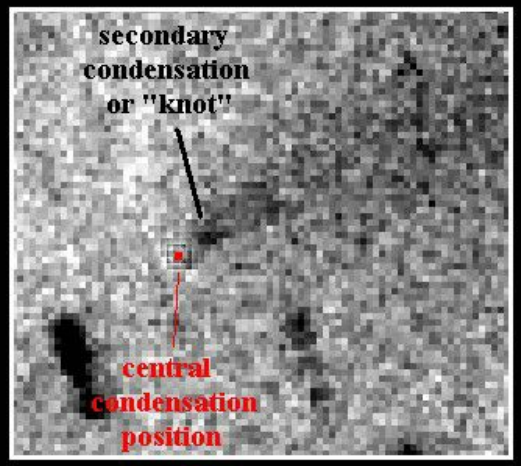
Claudine Rinner, Francois Kugel and team (A77)

Observatoire Chante-Perdrix – Dauban **43°59'59" Nord 05°38'51" Est Alt. 630 mètres (N43.9997 E5.6475)**

Abstand der beiden Peaks: 4.7“ in PA 301° laut email von Giovanni Sostero



delta~ 2.6 AU, r~ 3.1 AU, phase~ 17.5 deg



Azimuthal meadian subtraction

N

~10"

E

19P/Borrelly 2009, May 15.21
Remotely through the "Sierra Stars Observatory" (near Markleeville, CA)
0.61-m, f/10 Cassegrain + FLI Proline PL09000 CCD
540 sec total exposure time
P. Camilleri, E. Prosperi, G. Sostero and E. Guido

http://remanzacco.blogspot.com/
http://www.afamweb.com
http://cara.uai.it

2009-05-15.21 9 min. exp.

G.Sostero and team, remotely over Sierra Stars Observatory (G68)

Sierra Stars Observatory 38°48‘39" Nord 119°46’30" West, Höhe 1546 Meter

610 mm Cassegrain f-10 + ccd FLI Proline PL09000 0.8“/pixel

Abstand der beiden Peaks: 8“ in PA 311° laut email von Esteban Raina

2009-05-15.978 132 min. exp.

Esteban Raina (232)

Observatorio de Masquefa **41°30‘30" Nord 01°49‘52" Ost, Höhe 250 Meter**

250 mm SCT f-798mm + ccd ST7ME 2.17“/pixel

2009-05-16 21:35 50 min. exp.

Josep M. Bosch (B74)

Observatorio Santa Maria de Montmagastrell **41°38'53" Nord 01°8'28" Ost, Höhe 331 Meter**

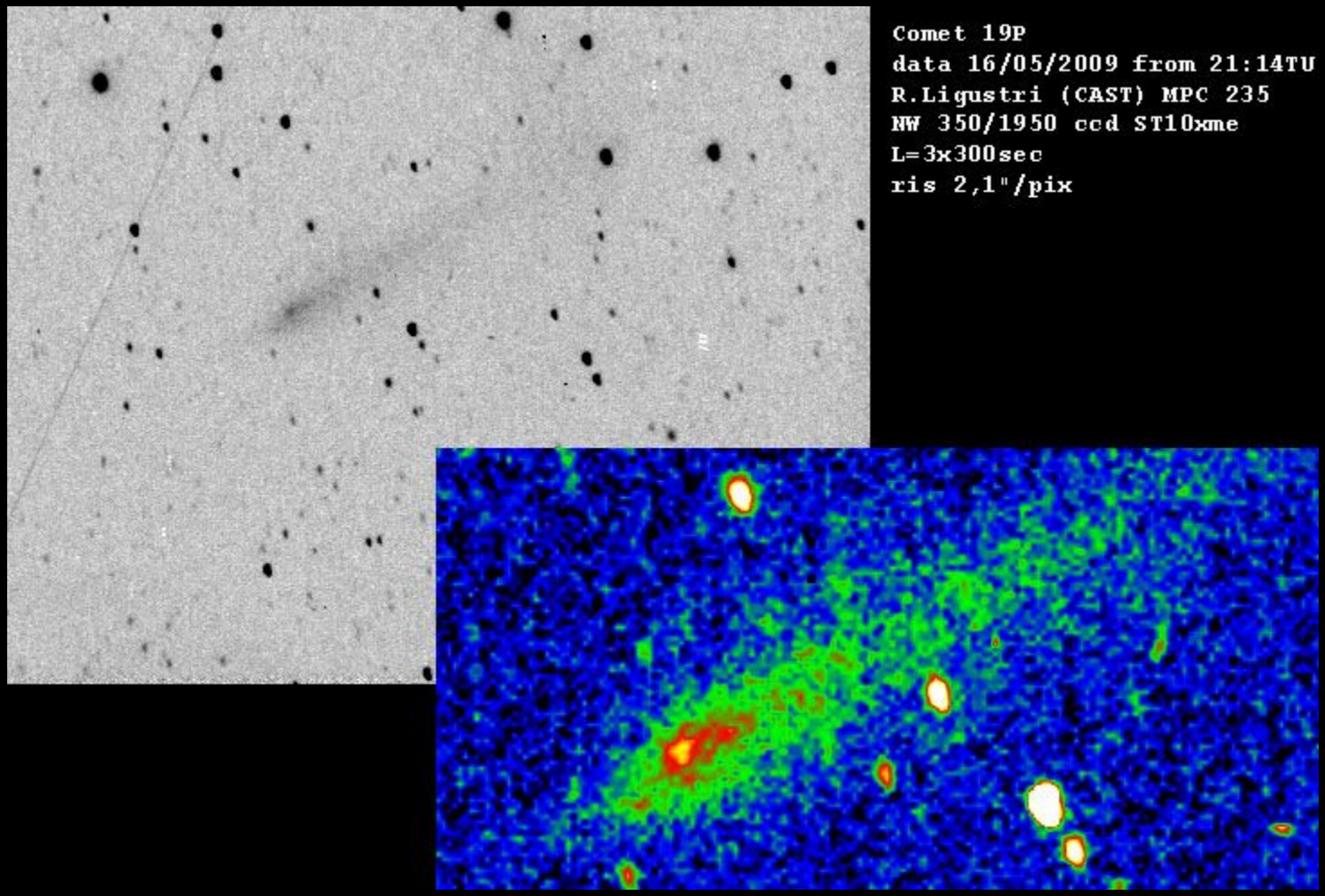
310 mm Newton f-4.9 + ccd ST9E 2.705"/pixel

2009-05-16 22:13 40 min. exp.

Gustavo Muler (J47)

Observatorio Nazaret **29°2'39" Nord 13°33'19" West Höhe 249 Meter**

305 mm SCT f-6 + ccd ST8XME 1.92"/pixel



2009-05-16 21:14 15 min.exp.

Rolando Ligustri (235)

Observatorio CAST (Talmassons) **45°56'12" Nord 13°06'52" Ost Höhe 42 Meter**

350 mm Newton f-1950mm + ccd ST10XME 2.1"/pixel

2009-05-17 .91 14 min. exp. 19P/Borrelly and NGC 4395

Claudine Rinner, Francois Kugel and team (A77)

Observatoire Chante-Perdrix – Dauban **43°59'59" Nord 05°38'51" Est Alt. 630 mètres (N43.9997**

IAUC Meldung vom 18. Mai 2009

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COMET 19P/BORRELLY

B. Haeusler, Maidbronn, Germany, writes that he found a secondary condensation or knot in comet 19P, located 13" from the primary condensation in p.a. 310 deg, on CCD images obtained with a 0.3-m Schmidt-Cassegrain reflector on May 7.91 UT. Informed of Haeusler's report, F. Kugel (Banon, France, 0.5-m telescope) notes that his unfiltered CCD exposures on May 10.87 show the secondary to be separated from the primary by 8" in p.a. 305 deg. G. Sostero, P. Camilleri, E. Prosperi, and E. Guido teamed up to obtain images of 19P remotely using a 0.61-m Cassegrain reflector at the Sierra Stars Observatory near Maarkleville, CA, U.S.A., on May 15.21, showing a tailward, diffuse secondary condensation or knot situated about 4".7 from the primary in p.a. 301 deg, which is about 1.5 mag fainter than the primary central condensation. Sostero et al. add that their observations on May 17.21 show that the secondary has significantly weakened, being more diffuse and elongated than on May 15, with its ambiguous optocenter being essentially unchanged in offset with respect to the primary.

(C) Copyright 2009 CBAT

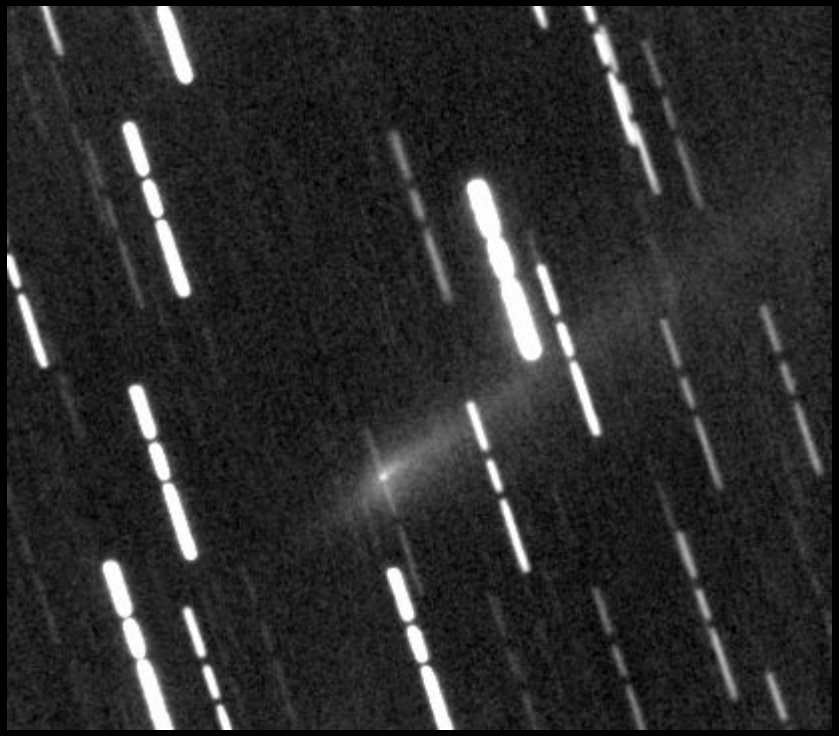
2009 May 18 (9044) Daniel W. E. Green

Aufnahme vom 18. Mai 2009

Gute Bedingungen:

Mond 35%, unter Horizont

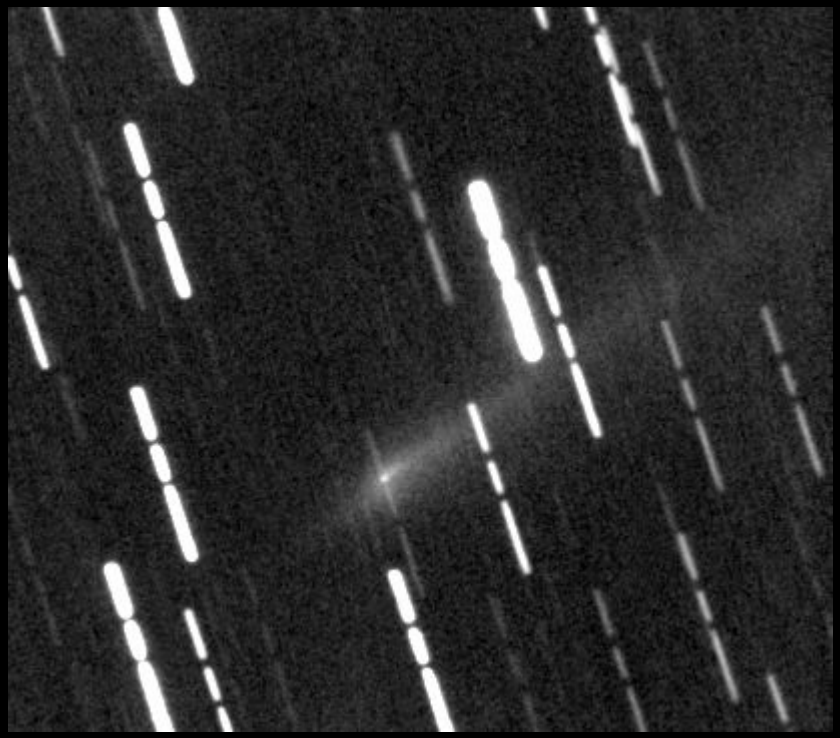
zweite Kondensation sichtbar



2009-05-18 UT 20:14 – 00:22 240 min. exp.

18.04 mag

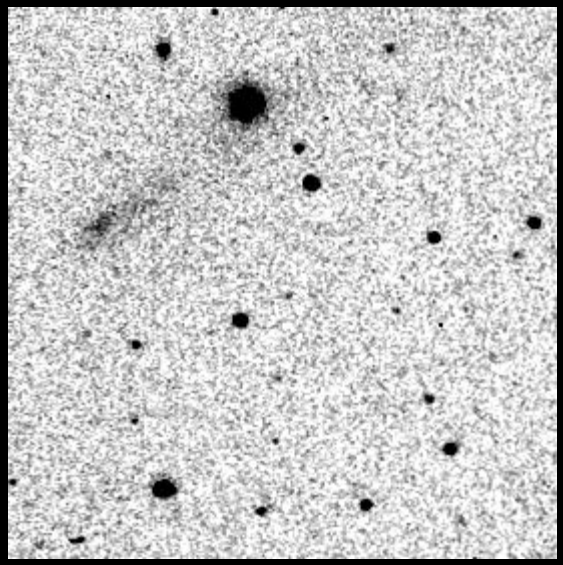
12“ SCT f-6.5 + ccd ST10XME, 1.413“/pixel



2009-05-18 UT 20:14 – 00:22 240 min. exp.

18.04 mag

12“ SCT f-6.5 + ccd ST10XME, 1.413“/pixel



2009-05-18 UT 20:14 – 00:22 240 min. exp.

18.04 mag

12" SCT f-6.5 + ccd ST10XME, 1.413"/pixel

2009-05-21 UT 21:04 – 00:19 180 min. exp.

17.91 mag

12“ SCT f-6.5 + ccd ST10XME, 1.413“/pixel

2009-05-21 22:09 33 min. exp.

Gustavo Muler (J47)

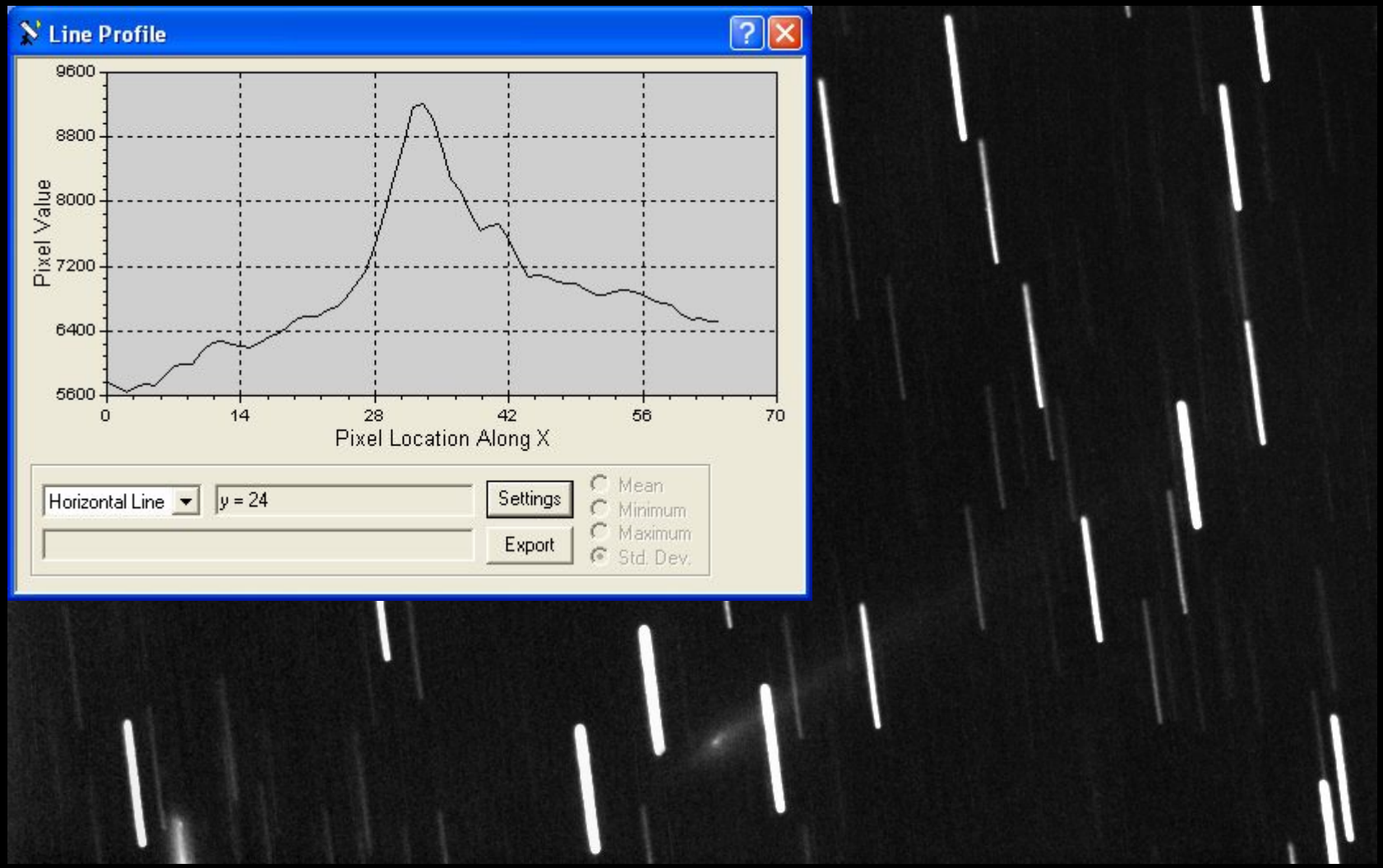
Observatorio Nazaret **29°2'39" Nord 13°33'19" West Höhe 249 Meter**

305 mm SCT f-6 + ccd ST8XME 1.92"/pixel

2009-05-24 UT 21:03 – 01:18 243 min. exp.

18.36 mag

12“ SCT f-6.5 + ccd ST10XME, 1.413“/pixel



2009-05-24 UT 21:03 – 01:18 243 min. exp.

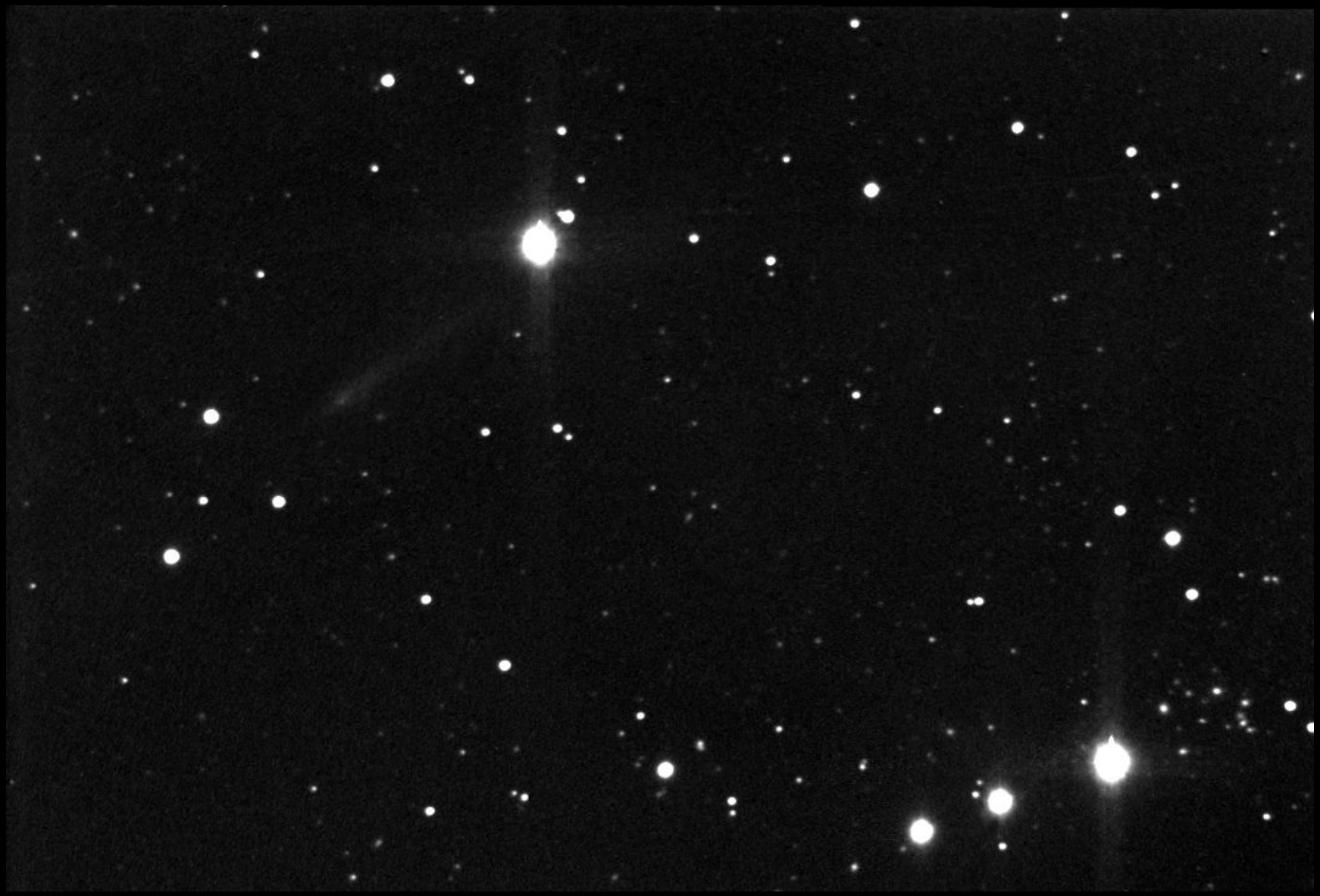
18.36 mag

12" SCT f-6.5 + ccd ST10XME, 1.413"/pixel

2009-06-12 UT 20:55 – 23:35 153 min. exp.

18.12 mag

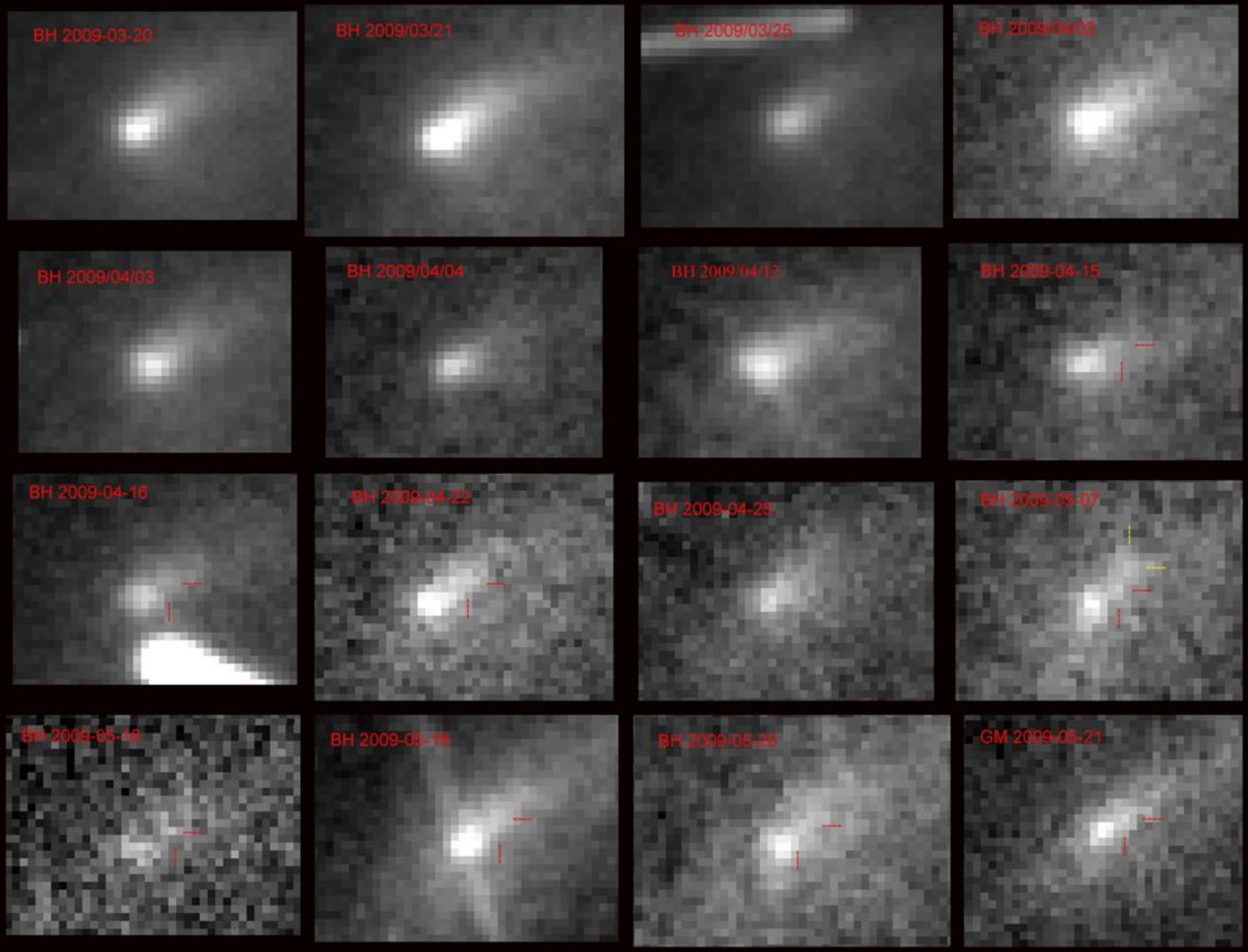
12“ SCT f-6.5 + ccd ST10XME, 1.413“/pixel

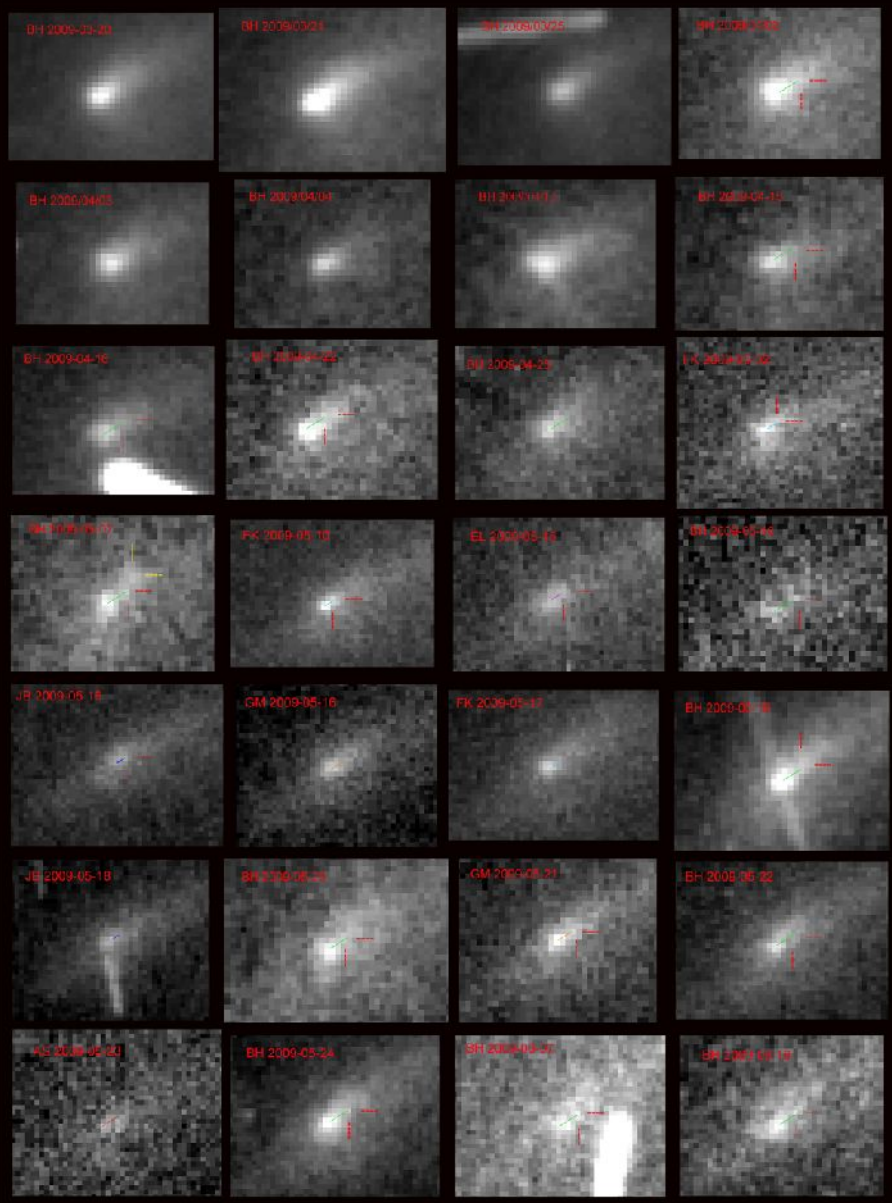


2009-06-16 UT 21:23 – 22:57 90 min. exp.

18.42 mag

12“ SCT f-6.5 + ccd ST10XME, 1.413“/pixel


BH 2009-03-20
BH 2009/03/21
BH 2009/03/25
BH 2009/04/02
BH 2009/04/03
BH 2009/04/04
BH 2009/04/12
BH 2009-04-15
BH 2009-04-16
BH 2009-04-22
BH 2009-04-25
BH 2009-05-07
BH 2009-05-16
BH 2009-05-18
BH 2009-05-20
GM 2009-05-21



--> distance between false nucleus and knot on Bernhard's images (BH 2009.xx.xx), Field of view: 1.411 pixel/arcsecond: ~5.6" in PA 302°

--> distance between false nucleus and knot on Albert's images (AS 2009.xx.xx), Field of view: 1.834 pixel/arcsecond: ~5.6" in PA 302°

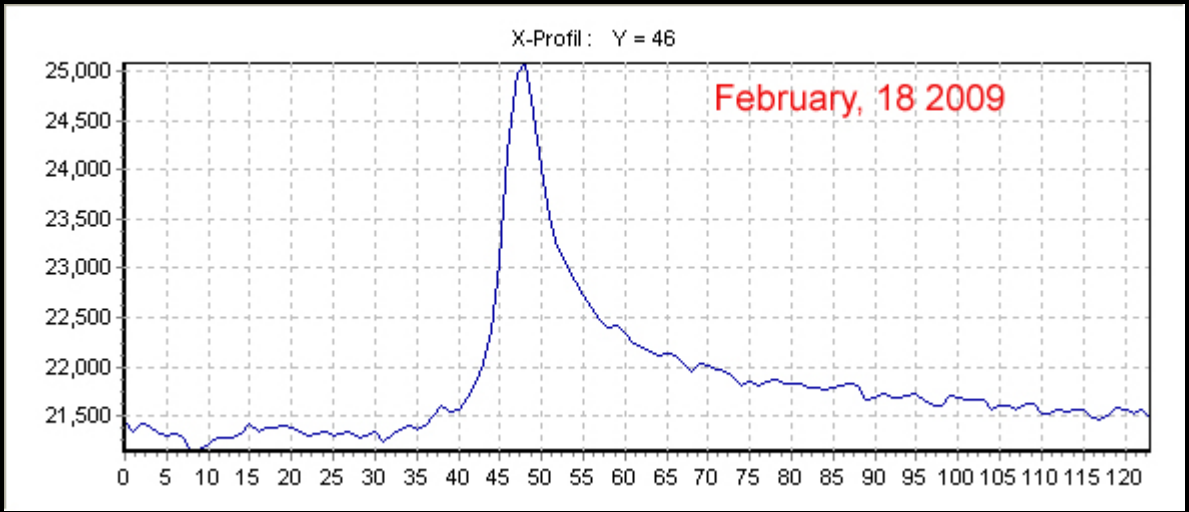
--> distance between false nucleus and knot on Gustavo's images (GM 2009.xx.xx), Field of view: 1.949 pixel/arcsecond: ~5.6" in PA 302°

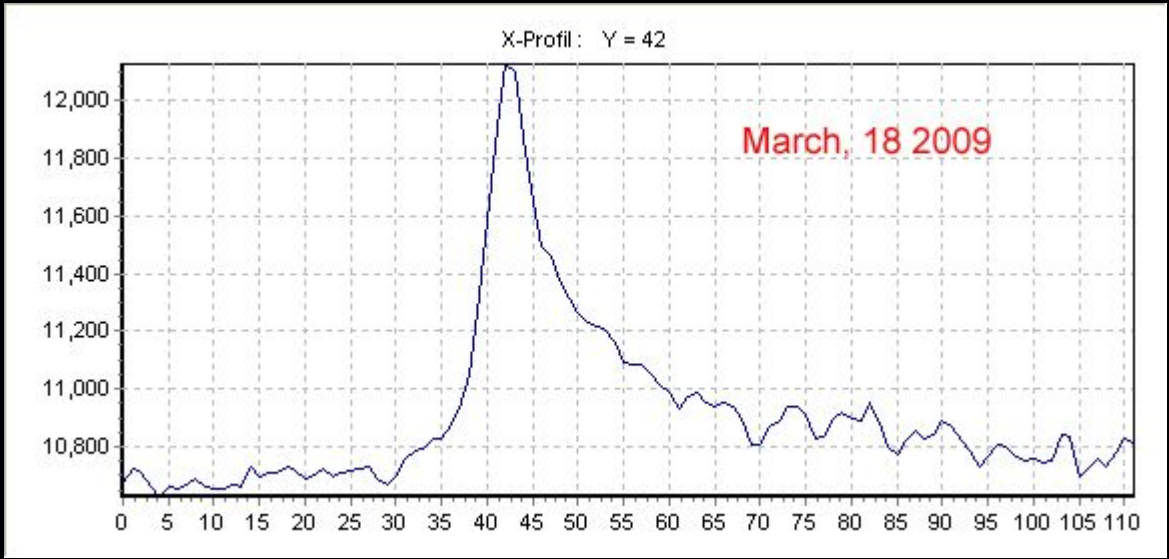
--> distance between false nucleus and knot on Francois's images (FK 2009.xx.xx), Field of view: 2.480 pixel/arcsecond: ~5.6" in PA 302°

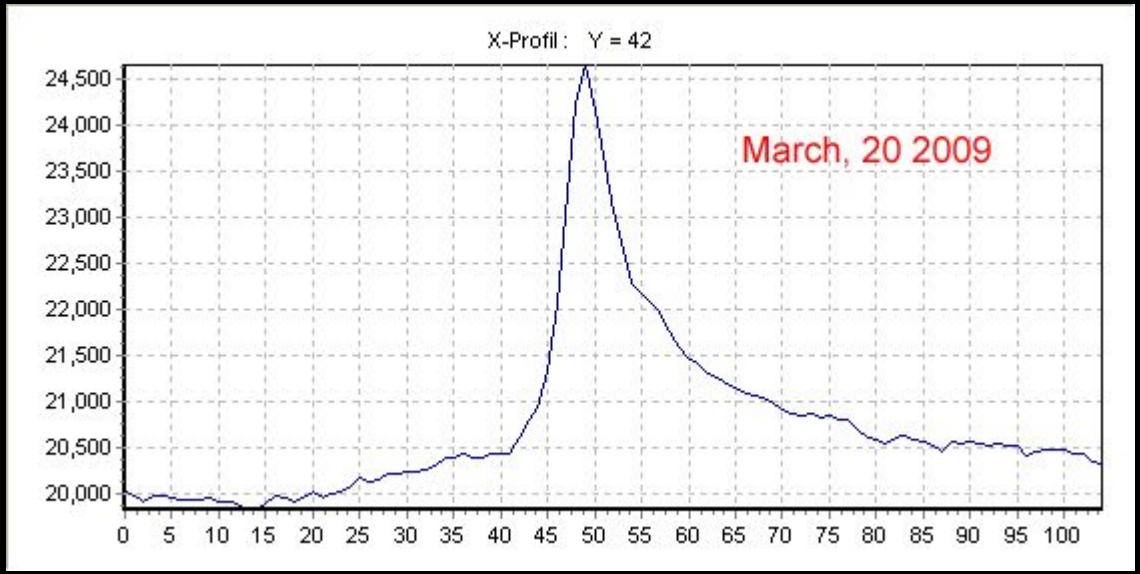
--> distance between false nucleus and knot on Esteban's image (EL 2009.xx.xx), Field of view: 2.170 pixel/arcsecond: ~5.6" in PA 302°

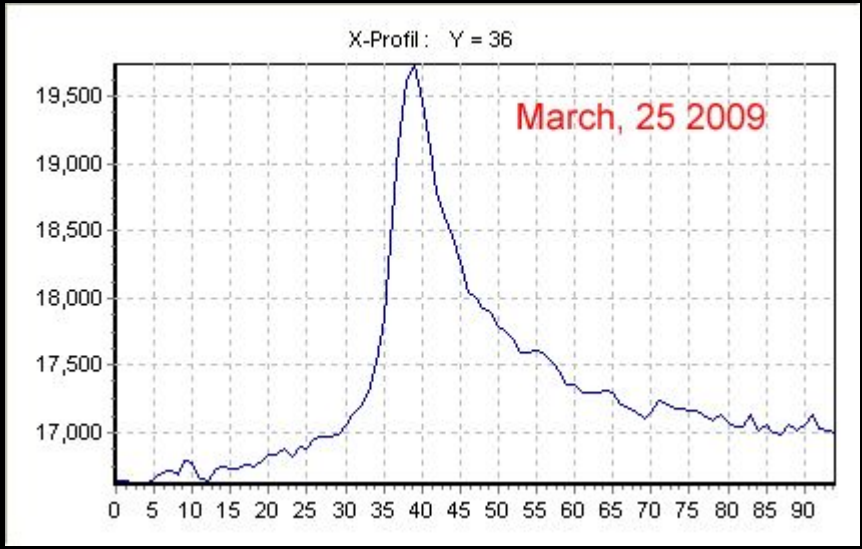
--> distance between false nucleus and knot on Josep's images (JB 2009.xx.xx), Field of view: 2.705 pixel/arcsecond: ~5.6" in PA 302°

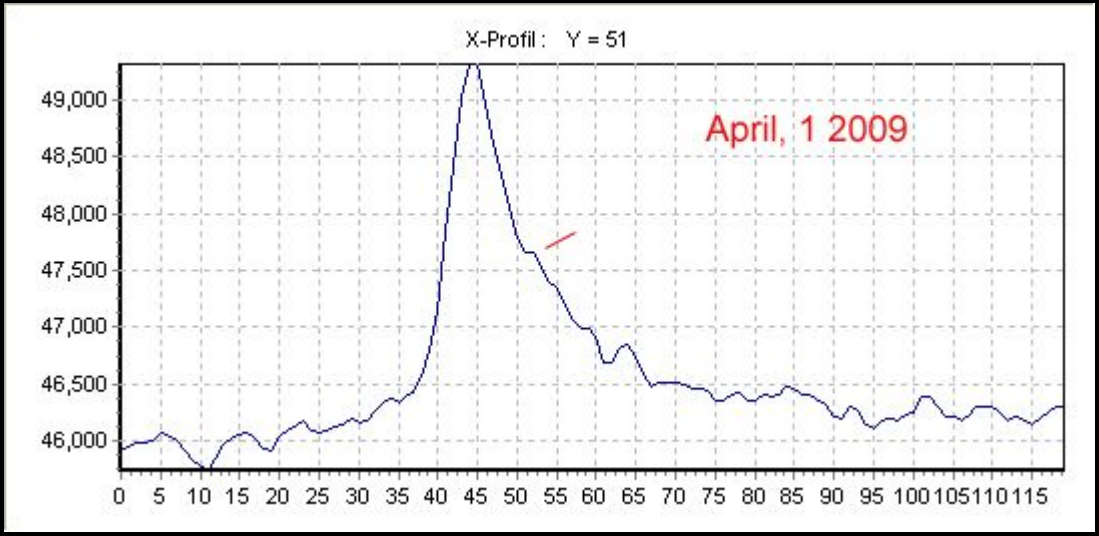
---- markers ---- first detection of Bernhard at May, 7

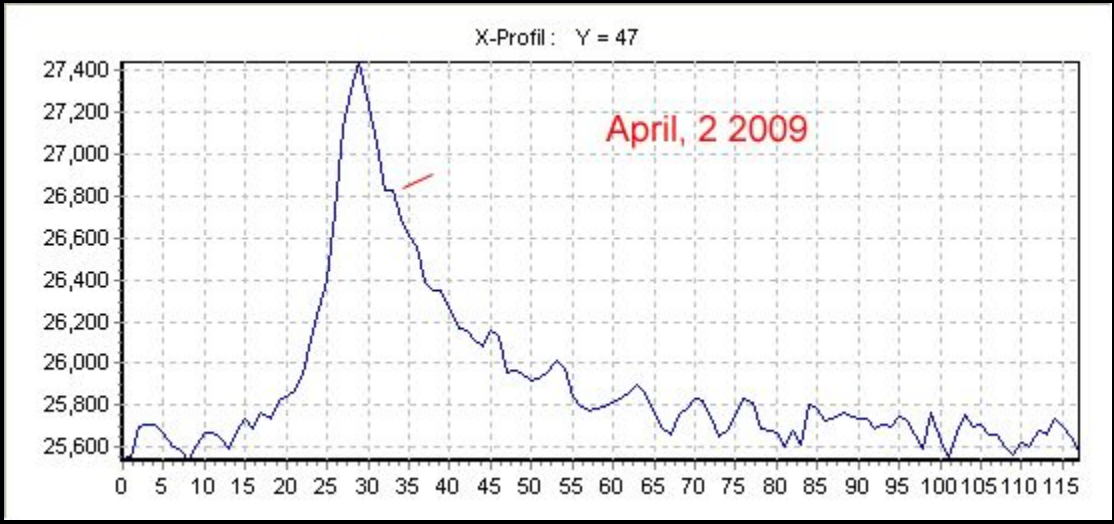

X-Profil : Y = 46
February, 18 2009
25,000
24,500
24,000
23,500
23,000
22,500
22,000
21,500
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115 120

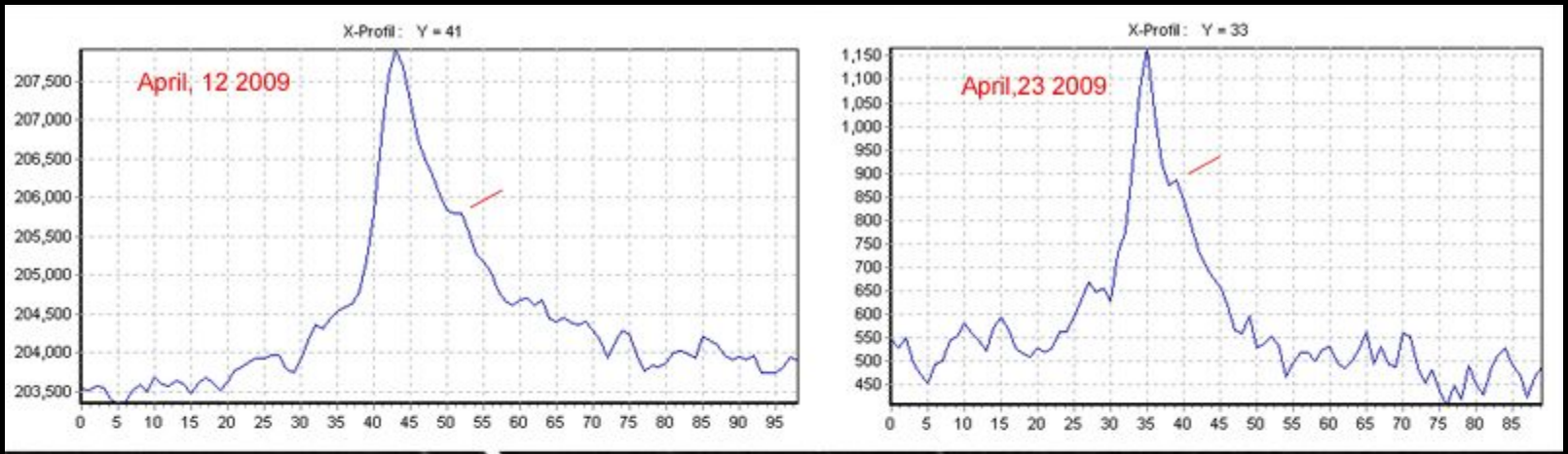

X-Profil : Y = 42
March, 18 2009
12,000
11,800
11,600
11,400
11,200
11,000
10,800
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110


X-Profil : Y = 42
March, 20 2009
24,500
24,000
23,500
23,000
22,500
22,000
21,500
21,000
20,500
20,000
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100

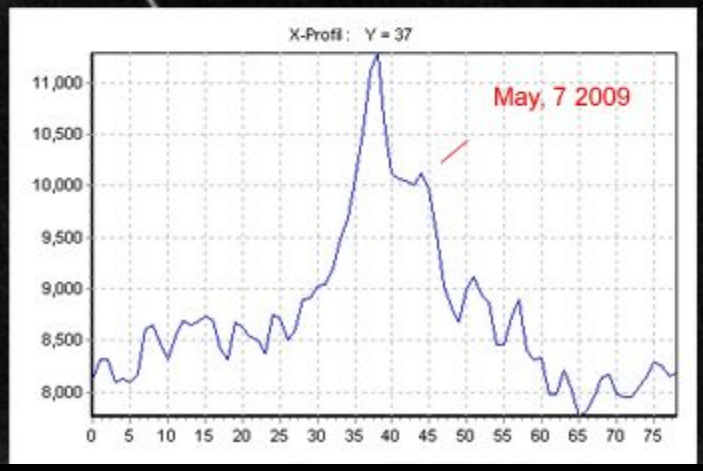

X-Profil : Y = 36
March, 25 2009
19,500
19,000
18,500
18,000
17,500
17,000
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90


X-Profil : Y = 51
April, 1 2009
49,000
48,500
48,000
47,500
47,000
46,500
46,000
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115


X-Profil : Y = 47
April, 2 2009
27,400
27,200
27,000
26,800
26,600
26,400
26,200
26,000
25,800
25,600
0 5 10 15 20 25 30 35 40 45 50 55 60 65 70 75 80 85 90 95 100 105 110 115



Line profiles of 19P/Borrelly



Die Ausgangssituation:

Im April und Mai 2009 ist eine zweite Kondensation im “offensichtlichen Hauptschweif“ sichtbar.

Man kann diese auf den Aufnahmen mehrerer Beobachter sehen und auch über Linienprofile nachvollziehen.

Die Fragestellung lautet nun:

Was haben wir beobachtet?

Herangehensweise:

Zunächst ist die Geometrie des Kometen zu klären, damit man Rückschlüsse auf die Ursache des Ereignisses ziehen kann.

Geometrie des Kometen

Geometrie des Kometen

HORIZONS Web-Interface

This tool provides a web-based *limited* interface to JPL's HORIZONS system which can be used to generate ephemerides for solar-system bodies. Full access to HORIZONS features is available via the primary telnet interface. HORIZONS system news shows recent changes and improvements. A web-interface tutorial is available to assist new users.

Current Settings

Ephemeris Type [change] : **OBSERVER**
Target Body [change] : **Comet 19P/Borrelly [2009]**
Observer Location [change] : **Maidbronn** [B82] (9°58'17.8"E, 49°50'46.8"N, 251.5 m)
Time Span [change] : Start=**2009-03-20**, Stop=**2009-03-21**, Step=**1 h**
Table Settings [change] : QUANTITIES=**1,9,16,27**
Display/Output [change] : *default* (formatted HTML)

16 = Sub Sun Pos. Angle & Dis.
27 = Pos.Angle, radius & -vel.

Generate Ephemeris

Special Options:

- set default geocentric observer settings (preserves only the selected target body)
- reset *all* settings to their defaults (caution: all previously stored/selected settings will be lost)
- show "batch-file" data (for use by the E-mail interface)

Ergebnis des Queries:

Positionswinkel des Kometen Richtung Sonne und vice versa

```
*****************************************************************************************
 Date__(UT)__HR:MN     R.A._(ICRF/J2000.0)_DEC  T-mag  N-mag SN.ang   SN.dist   PsAng   PsAMV
*****************************************************************************************
$$SOE
 2009-Mar-20 00:00     13 22 46.04 +39 56 44.3  16.51  17.89  31.36      0.00 211.347 318.334
 2009-Mar-20 01:00     13 22 42.81 +39 56 53.0  16.51  17.89  31.28      0.00 211.268 318.319
 2009-Mar-20 02:00     13 22 39.57 +39 57 01.5  16.51  17.89  31.20      0.00 211.189 318.304
 2009-Mar-20 03:00  m  13 22 36.35 +39 57 09.8  16.51  17.89  31.13      0.00 211.110 318.289
 2009-Mar-20 04:00 Am  13 22 33.13 +39 57 18.0  16.51  17.89  31.05      0.00 211.031 318.274
 2009-Mar-20 05:00 Cm  13 22 29.92 +39 57 26.0  16.51  17.89  30.97      0.00 210.953 318.259
 2009-Mar-20 06:00 *m  13 22 26.72 +39 57 34.0  16.52  17.89  30.89      0.00 210.875 318.244
 2009-Mar-20 07:00 *m  13 22 23.54 +39 57 41.9  16.52  17.89  30.81      0.00 210.797 318.229
 2009-Mar-20 08:00 *m  13 22 20.38 +39 57 49.7  16.52  17.89  30.73      0.00 210.719 318.214
 2009-Mar-20 09:00 *m  13 22 17.24 +39 57 57.6  16.52  17.89  30.66      0.00 210.642 318.199
 2009-Mar-20 10:00 *m  13 22 14.10 +39 58 05.5  16.52  17.89  30.58      0.00 210.564 318.185
 2009-Mar-20 11:00 *   13 22 10.98 +39 58 13.4  16.52  17.89  30.50      0.00 210.487 318.170
 2009-Mar-20 12:00 *   13 22 07.87 +39 58 21.4  16.52  17.89  30.43      0.00 210.410 318.156
 2009-Mar-20 13:00 *   13 22 04.75 +39 58 29.5  16.52  17.89  30.35      0.00 210.333 318.141
 2009-Mar-20 14:00 *   13 22 01.64 +39 58 37.7  16.52  17.89  30.27      0.00 210.255 318.127
 2009-Mar-20 15:00 *   13 21 58.52 +39 58 46.0  16.52  17.89  30.19      0.00 210.178 318.112
 2009-Mar-20 16:00 *   13 21 55.39 +39 58 54.4  16.52  17.90  30.12      0.00 210.100 318.098
 2009-Mar-20 17:00 *   13 21 52.25 +39 59 02.7  16.53  17.90  30.04      0.00 210.022 318.083
 2009-Mar-20 18:00 C   13 21 49.09 +39 59 11.2  16.53  17.90  29.96      0.00 209.944 318.068
 2009-Mar-20 19:00 A   13 21 45.91 +39 59 19.6  16.53  17.90  29.88      0.00 209.866 318.054
 2009-Mar-20 20:00     13 21 42.71 +39 59 27.9  16.53  17.90  29.80      0.00 209.787 318.039
 2009-Mar-20 21:00     13 21 39.50 +39 59 36.2  16.53  17.90  29.72      0.00 209.708 318.024
 2009-Mar-20 22:00     13 21 36.27 +39 59 44.4  16.53  17.90  29.65      0.00 209.629 318.009
 2009-Mar-20 23:00     13 21 33.02 +39 59 52.4  16.53  17.90  29.57      0.00 209.550 317.994
 2009-Mar-21 00:00     13 21 29.77 +40 00 00.3  16.53  17.90  29.49      0.00 209.471 317.979
$$EOE
*****************************************************************************************
```

Geometrie des Kometen

Geometrie des Kometen

Geometrie des Kometen

2009-05-07 UT 21:56 – 00:12 132 min. exp.

17.66 mag

12“ SCT f-6.5 + ccd ST10XME, 1.413“/pixel

Geometrie des Kometen

2009-05-07 UT 21:56 – 00:12 132 min. exp.

17.66 mag

12“ SCT f-6.5 + ccd ST10XME, 1.413“/pixel

Geometrie des Kometen

2009-05-07 UT 21:56 – 00:12 132 min. exp.

17.66 mag

12“ SCT f-6.5 + ccd ST10XME, 1.413“/pixel

Vorläufiges Ergebnis:

Die zweite Kondensation befindet sich auf der sonnenzugewandten Seite der zentralen Kondensation.

Der PW der zweiten Kondensation entspricht im Wesentlichen dem SN. Pos.winkel von 320°

Statement von Dr. Nalin Samarasinha vom PSI Planetary Science Institute in Tuscon, Arizona:

Zitat

„Die Beobachtung ist sehr interessant, kann aber normalerweise kein Fragment sein, da diese in der Regel von nicht-gravitativen Kräften wie dem Sonnenwind in Richtung des eigentlichen Schweifes gedrückt werden, und nicht in Richtung der Sonne.

Aufgrund dieser Erkenntnis kann man schließen, dass es sich bei der Beobachtung wahrscheinlich um ein Schweifereignis handelt.

Diese Schlussfolgerung kann auch untermauert werden, wenn man seinen Blick zurück zur DS1 Mission der NASA im Jahre 2001 wendet.

Auf den Bildern der Mission waren zwei Polarjets zu sehen, welche ungefähr in Richtung zur Sonne hin aktiv waren.

Das neue Phenomen könnte also ein Staubereignis sein, welches dem damals von der DS1 Mission beobachteten sonnengerichteten Polarjets entspricht.“

Um dies zu verifizieren hat Dr. Nalin Samarasinha die räumliche Geometrie des Kometenkörpers am 7. Mai 2009 überprüft.

Er fand heraus, dass sich der Pol mit den aktiven Jets der NASA Mission im Mai 2009 in völliger Dunkelheit befand.

„Die jetzt beobachten Phenomene entstammen wahrscheinlich vom gegenüberliegenden Pol des Kometen. Wenn jemand auf diesem Pol stünde, könnte er die Sonne in ca. 60° Höhe über dem Horizont sehen.

Man könne nun annehmen, dass der Komet aktuell Jets vom gegenüberliegenden Pol aussendet.“

Ich freue mich schon heute auf die nächste Opposition von 19P/Borrelly im Jahre 2015