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# IAU Minor Planet Center

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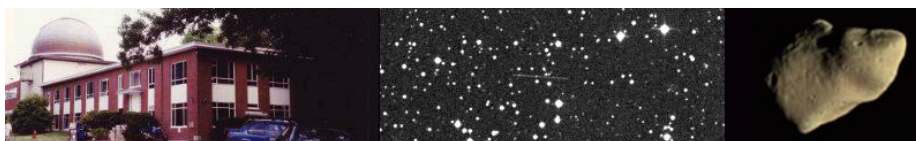
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M.P.E.C. 2010-N43

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### 2010 NK1

#### Observations:

|          |        |    |             |    |       |       |     |    |      |      |   |          |
|----------|--------|----|-------------|----|-------|-------|-----|----|------|------|---|----------|
| K10N01K* | C2010  | 07 | 07.22990    | 14 | 42    | 09.54 | +28 | 53 | 00.0 | 18.0 | V | EN043703 |
| K10N01K  | C2010  | 07 | 07.23794    | 14 | 42    | 20.55 | +28 | 53 | 22.1 | 17.7 | V | EN043703 |
| K10N01K  | C2010  | 07 | 07.24197    | 14 | 42    | 26.02 | +28 | 53 | 34.1 | 18.1 | V | EN043703 |
| K10N01K  | C2010  | 07 | 07.24947    | 14 | 42    | 36.39 | +28 | 53 | 54.7 | 17.8 | V | EN043703 |
| K10N01K  | C2010  | 07 | 07.28075    | 14 | 43    | 19.45 | +28 | 55 | 18.4 | 17.9 | V | EN043G96 |
| K10N01K  | C2010  | 07 | 07.28115    | 14 | 43    | 19.99 | +28 | 55 | 19.5 | 17.9 | V | EN043G96 |
| K10N01K  | C2010  | 07 | 07.28154    | 14 | 43    | 20.53 | +28 | 55 | 20.5 | 17.9 | V | EN043G96 |
| K10N01K  | C2010  | 07 | 07.28194    | 14 | 43    | 21.10 | +28 | 55 | 21.8 | 18.1 | V | EN043G96 |
| K10N01K  | C2010  | 07 | 07.33501    | 14 | 44    | 34.47 | +28 | 57 | 36.7 | 17.9 | V | EN043G96 |
| K10N01K  | C2010  | 07 | 07.33537    | 14 | 44    | 34.98 | +28 | 57 | 37.5 | 18.0 | V | EN043G96 |
| K10N01K  | C2010  | 07 | 07.33575    | 14 | 44    | 35.52 | +28 | 57 | 38.6 | 18.0 | V | EN043G96 |
| K10N01K  | C2010  | 07 | 07.33610    | 14 | 44    | 35.98 | +28 | 57 | 39.4 | 17.9 | V | EN043G96 |
| K10N01K  | C2010  | 07 | 07.55403    | 14 | 49    | 43.03 | +29 | 08 | 31.2 | 17.9 | R | EN043300 |
| K10N01K  | C2010  | 07 | 07.55477    | 14 | 49    | 44.03 | +29 | 08 | 32.9 | 17.8 | R | EN043300 |
| K10N01K  | C2010  | 07 | 07.55547    | 14 | 49    | 44.98 | +29 | 08 | 34.6 | 17.7 | R | EN043300 |
| K10N01K  | C2010  | 07 | 07.55617    | 14 | 49    | 45.84 | +29 | 08 | 36.4 | 17.7 | R | EN043300 |
| K10N01K  | C2010  | 07 | 07.55687    | 14 | 49    | 46.76 | +29 | 08 | 38.5 | 17.9 | R | EN043300 |
| K10N01K  | C2010  | 07 | 07.55827    | 14 | 49    | 48.52 | +29 | 08 | 41.7 | 17.9 | R | EN043300 |
| K10N01K  | C2010  | 07 | 07.55898    | 14 | 49    | 49.48 | +29 | 08 | 43.3 | 18.0 | R | EN043300 |
| K10N01K  | KC2010 | 07 | 07.86126    | 14 | 56    | 31.78 | +29 | 20 | 35.3 | 18.3 | V | EN043595 |
| K10N01K  | KC2010 | 07 | 07.86180    | 14 | 56    | 32.50 | +29 | 20 | 36.1 | 18.3 | R | EN043473 |
| K10N01K  | KC2010 | 07 | 07.86458    | 14 | 56    | 35.90 | +29 | 20 | 41.9 | 18.3 | R | EN043473 |
| K10N01K  | KC2010 | 07 | 07.86509    | 14 | 56    | 36.47 | +29 | 20 | 43.3 | 18.3 | V | EN043595 |
| K10N01K  | KC2010 | 07 | 07.89104    | 14 | 57    | 09.77 | +29 | 21 | 58.2 | 17.5 | C | EN043C12 |
| K10N01K  | KC2010 | 07 | 07.89354    | 14 | 57    | 12.83 | +29 | 22 | 02.0 | 17.1 | C | EN043C12 |
| K10N01K  | KC2010 | 07 | 07.89605    | 14 | 57    | 15.90 | +29 | 22 | 08.4 | 16.8 | C | EN043C12 |
| K10N01K  | KC2010 | 07 | 07.89855    | 14 | 57    | 18.88 | +29 | 22 | 12.5 | 17.3 | C | EN043C12 |
| K10N01K  | C2010  | 07 | 08.10300215 | 01 | 38.22 | +29   | 29  | 29 | 33.8 | 18.7 | V | EN043H21 |
| K10N01K  | C2010  | 07 | 08.10762315 | 01 | 43.60 | +29   | 29  | 29 | 42.5 | 18.2 | V | EN043H21 |
| K10N01K  | C2010  | 07 | 08.11571415 | 01 | 52.94 | +29   | 29  | 29 | 57.7 | 18.4 | V | EN043H21 |
| K10N01K  | KC2010 | 07 | 08.14207    | 15 | 02    | 21.17 | +29 | 30 | 28.8 | 18.5 | R | EN043932 |
| K10N01K  | KC2010 | 07 | 08.14608    | 15 | 02    | 25.86 | +29 | 30 | 35.4 | 18.4 | R | EN043932 |
| K10N01K  | JC2010 | 07 | 08.23948    | 15 | 04    | 18.85 | +29 | 34 | 04.4 | 18.4 | C | EN043695 |

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|---------|--------|----|----------|----|----|-------|-----|----|------|------|---|----------|
| K10N01K | jC2010 | 07 | 08.24074 | 15 | 04 | 20.27 | +29 | 34 | 06.3 | 18.5 | C | EN043695 |
| K10N01K | jC2010 | 07 | 08.24146 | 15 | 04 | 21.08 | +29 | 34 | 07.6 | 18.5 | C | EN043695 |
| K10N01K | tC2010 | 07 | 08.29244 | 15 | 05 | 19.25 | +29 | 35 | 21.4 |      |   | EN043291 |
| K10N01K | tC2010 | 07 | 08.29681 | 15 | 05 | 24.23 | +29 | 35 | 28.0 |      |   | EN043291 |
| K10N01K | tC2010 | 07 | 08.30147 | 15 | 05 | 29.59 | +29 | 35 | 33.9 |      |   | EN043291 |
| K10N01K | KC2010 | 07 | 08.52718 | 15 | 09 | 56.70 | +29 | 45 | 06.5 |      |   | EN043D96 |
| K10N01K | KC2010 | 07 | 08.53206 | 15 | 10 | 01.90 | +29 | 45 | 12.2 |      |   | EN043D96 |

Observer details:

[291 LPL/Spacewatch II.](#) Observer T. H. Bressi. 1.8-m f/2.7 reflector + CCD.  
[300 Bisei Spaceguard Center--BATTERS.](#) Observers N. Hashimoto, S. Okumura. 1.0-m f/3.0 reflector + CCD.  
[473 Remanzacco.](#) Observers L. Donato, V. Gonano, E. Guido, G. Sostero. 0.45-m f/4.4 Newtonian reflector + CCD.  
[595 Farra d'Isonzo.](#) Observers L. Bittesini, E. Pettarin, F. Piani. Measurer E. Pettarin. 0.40-m f/4.5 reflector + CCD.  
[695 Kitt Peak.](#) Observers R. Crawford, T. Kaye, M. Trueblood. Measurer R. Crawford. 0.9-m f/8 Ritchey-Chretien + CCD.  
[703 Catalina Sky Survey.](#) Observer R. E. Hill. Measurers J. D. Ahern, E. C. Beshore, A. Boattini, G. J. Garradd, A. R. Gibbs, A. D. Grauer, R. E. Hill, R. A. Kowalski, S. M. Larson, R. H. McNaught. 0.68-m Schmidt + CCD.  
[932 John J. McCarthy Obs., New Milford.](#) Observer S. Riley. 0.4-m f/6.5 Schmidt-Cassegrain + CCD.  
 C12 Berta Observatory, Sabadell. Observer M. Duran. 0.3-m f/4.46 Newtonian reflector + CCD.  
[D96 Tzec Maun Observatory, Moorook.](#) Observers L. Buzzi, P. Concari, S. Foglia, G. Galli, M. Tombelli. 0.18-m f/2.8 Newtonian reflector + CCD.  
[G96 Mt. Lemmon Survey.](#) Observer A. Boattini. Measurers J. D. Ahern, E. C. Beshore, A. Boattini, G. J. Garradd, A. R. Gibbs, A. D. Grauer, R. E. Hill, R. A. Kowalski, S. M. Larson, R. H. McNaught. 1.5-m reflector + CCD.  
 H21 Astronomical Research Observatory, Westfield. Observer R. Holmes. Measurer S. Foglia.

Orbital elements:

2010 NK1 Earth [MOID](#) = 0.0107 AU  
 Epoch 2010 July 23.0 TT = JDT 2455400.5 MPC

|   |            |       |           |             |      |             |   |
|---|------------|-------|-----------|-------------|------|-------------|---|
| M | 97.43287   |       | (2000.0)  | P           |      | Q           |   |
| n | 0.96440992 | Peri. | 262.74060 | -0.96714099 |      | +0.00427392 |   |
| a | 1.0146002  | Node  | 277.26446 | +0.10487999 |      | -0.90411184 |   |
| e | 0.1846560  | Incl. | 14.84836  | -0.23159988 |      | -0.42727452 |   |
| P | 1.02       | H     | 22.2      | G           | 0.15 | U           | 7 |

Residuals in seconds of arc

|        |     |      |      |        |     |      |      |        |     |      |      |
|--------|-----|------|------|--------|-----|------|------|--------|-----|------|------|
| 100707 | 703 | 0.0  | 0.2+ | 100707 | 300 | 0.7+ | 0.3- | 100708 | H21 | 0.2+ | 0.1+ |
| 100707 | 703 | 0.3- | 0.3- | 100707 | 300 | 0.1+ | 0.1- | 100708 | H21 | 0.3- | 0.3+ |
| 100707 | 703 | 1.0- | 0.5+ | 100707 | 300 | 0.3+ | 0.3+ | 100708 | 932 | 0.1- | 0.3- |
| 100707 | 703 | 0.1- | 0.4+ | 100707 | 300 | 0.4- | 0.2+ | 100708 | 932 | 0.1+ | 0.3- |
| 100707 | G96 | 0.4+ | 0.0  | 100707 | 300 | 0.2+ | 0.2+ | 100708 | 695 | 0.2- | 0.2- |
| 100707 | G96 | 0.2+ | 0.0  | 100707 | 595 | 0.4- | 0.7- | 100708 | 695 | 0.4- | 0.3- |
| 100707 | G96 | 0.2+ | 0.0  | 100707 | 473 | 0.3- | 0.6- | 100708 | 695 | 0.5- | 0.1- |
| 100707 | G96 | 0.5+ | 0.2+ | 100707 | 473 | 0.4- | 0.6- | 100708 | 291 | 0.3+ | 0.3- |
| 100707 | G96 | 0.1- | 0.0  | 100707 | 595 | 0.5- | 0.6- | 100708 | 291 | 0.1+ | 0.4+ |
| 100707 | G96 | 0.0  | 0.1- | 100707 | C12 | 0.2- | 0.9+ | 100708 | 291 | 0.4+ | 0.1- |
| 100707 | G96 | 0.2+ | 0.0  | 100707 | C12 | 0.2+ | 0.4- | 100708 | D96 | 0.3- | 0.8+ |
| 100707 | G96 | 0.2- | 0.0  | 100707 | C12 | 0.5+ | 0.9+ | 100708 | D96 | 0.9- | 0.2+ |
| 100707 | 300 | 0.4- | 0.3- | 100707 | C12 | 0.2- | 0.0  |        |     |      |      |
| 100707 | 300 | 0.1+ | 0.3- | 100708 | H21 | 0.1- | 0.2+ |        |     |      |      |

Ephemeris:

2010 NK1 a,e,i = 1.01, 0.18, 15 q = 0.8272

|      |    |              |          |          |        |        |       |       |      |
|------|----|--------------|----------|----------|--------|--------|-------|-------|------|
| Date | TT | R. A. (2000) | Decl.    | Delta    | r      | Elong. | Phase | V     |      |
| 2010 | 07 | 03           | 12 20.04 | +18 39.5 | 0.0292 | 1.010  | 76.8  | 101.6 | 18.3 |
| 2010 | 07 | 13           | 16 09.62 | +30 07.3 | 0.0688 | 1.042  | 109.4 | 67.0  | 18.8 |
| 2010 | 07 | 23           | 17 03.56 | +28 33.3 | 0.122  | 1.071  | 113.9 | 60.1  | 19.9 |
| 2010 | 08 | 02           | 17 28.13 | +26 44.7 | 0.175  | 1.098  | 114.2 | 57.5  | 20.7 |
| 2010 | 08 | 12           | 17 45.54 | +24 48.6 | 0.229  | 1.123  | 113.1 | 56.1  | 21.3 |
| 2010 | 08 | 22           | 18 01.44 | +22 47.7 | 0.282  | 1.145  | 111.4 | 55.4  | 21.8 |

Sonia Keys

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