MPEC 2021-X115 : 2021 XO2

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MPC@CFA.HARVARD.EDU
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2021 XO2

Observations:

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     K21X02O* C2021 12 04.36890103 40 40.98 +18 53 33.4              VEX115703
     K21X02O  C2021 12 04.37413503 40 49.08 +18 56 30.7         17.74GVEX115703
     K21X02O  C2021 12 04.37936903 40 57.17 +18 59 26.3         17.66GVEX115703
     K21X02O  C2021 12 04.38460103 41 05.19 +19 02 20.1         17.51GVEX115703
     K21X02O  C2021 12 04.40833903 41 41.40 +19 15 10.5         17.4 GVEX115H01
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     K21X02O mC2021 12 04.42767103 42 11.70 +19 25 54.6         17.73GVEX115I52
     K21X02O mC2021 12 04.42783603 42 11.96 +19 25 59.9         17.63GVEX115I52
     K21X02O mC2021 12 04.42800403 42 12.21 +19 26 05.4         17.53GVEX115I52
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     K21X02O  C2021 12 04.48253 03 43 38.69 +19 54 13.2         17.5  rEX115718
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     K21X02O  C2021 12 04.69837803 49 24.06 +21 43 17.6         18.2 rVEX115N51
     K21X02O KC2021 12 04.72325703 50 07.94 +21 52 32.5         17.9 GVEX115L18
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     K21X02O KC2021 12 04.76544103 51 06.63 +22 11 02.7         17.9 GVEX115J95
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     K21X02O KC2021 12 04.92653 03 54 24.85 +23 20 53.2         18.3 VqEX115C77
     K21X02O KC2021 12 04.92866 03 54 27.32 +23 21 44.4         18.5 VqEX115C77
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     K21X02O KC2021 12 05.08212403 57 46.45 +24 20 58.1         18.3 VuEX115H21
     K21X02O KC2021 12 05.08405403 57 48.58 +24 21 41.7         18.2 VuEX115H21
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     K21X02O KC2021 12 05.08984303 57 54.91 +24 23 52.0          18.2 VuEX115H21
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     K21X02O 1C2021 12 05.12556 03 58 10.97 +24 35 21.6          18.9 VVEX115033
     K21X02O 1C2021 12 05.12590 03 58 11.36 +24 35 28.9          18.9 VVEX115033
     K21X02O  C2021 12 05.14916 03 59 03.60 +24 45 41.2          17.5 VtEX115V27
     K21X02O  C2021 12 05.15271 03 59 06.99 +24 47 01.3          17.9 VtEX115V27
     K21X02O  C2021 12 05.15666 03 59 11.45 +24 48 24.3          18.1 VtEX115V27
     K21X02O  C2021 12 05.16968 03 59 24.94 +24 53 03.8          18.3 VtEX115V27
     K21X02O  C2021 12 05.17955 03 59 35.47 +24 56 32.4          17.7 VtEX115V27
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     K21X02O mC2021 12 05.22093704 00 18.71 +25 11 17.3          18.14GVEX115I52
     K21X02O mC2021 12 05.22110004 00 18.88 +25 11 20.5          18.14GVEX115I52
     K21X02O mC2021 12 05.22126404 00 19.03 +25 11 24.0          18.15GVEX115I52
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     K21X02O  C2021 12 05.24995 04 00 47.67 +25 20 29.1          18.4  rEX115718
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     K21X02O KC2021 12 05.28229 04 01 18.19 +25 32 00.1          18.5 GVEX115V21
     K21X02O KC2021 12 05.28979 04 01 25.44 +25 34 28.0          19.0 GVEX115V21
     K21X02O KC2021 12 05.29729 04 01 32.66 +25 36 54.6          19.1 GVEX115V21
     K21X02O KC2021 12 05.30778 04 01 42.74 +25 40 18.8          18.8 GVEX115V21
     K21X02O KC2021 12 05.31228 04 01 47.07 +25 41 45.6          18.6 GVEX115V21
```

Observer details:

033 Karl Schwarzschild Observatory, Tautenburg. Observers S. Melnikov, C. Hoegner, U. Laux, F. Ludwig, B. Stecklum. Measurer B. Stecklum. 1.34-m f/3 Schmidt + CCD.

703 Catalina Sky Survey. Observer D. C. Fuls. Measurers E. J. Christensen, G. A. Farneth, D. C. Fuls, A. R. Gibbs, A. D. Grauer, H. Groeller, R. A. Kowalski, S. M. Larson, G. J. Leonard, D. Rankin, R. L. Seaman, F. C. Shelly, K. W. Wierzchos. 0.68-m Schmidt + 10K CCD.

718 Tooele. Observer P. Wiggins. 0.35-m f/5.5 Schmidt-Cassegrain + CCD.

B49 Paus Observatory, Sabadell. Observer J. Camarasa. 0.30-m f/4.0 reflector + CCD.

C77 Bernezzo Observatory. Observer A. Mantero. 0.25-m f/4.0 reflector + CCD.

C95 SATINO Remote Observatory, Haute Provence. Observer J. Jahn. 0.60-m f/3.2 Newtonian reflector + CCD.

H01 Magdalena Ridge Observatory, Socorro. Observers W. H. Ryan, E. V. Ryan. Measurer W. H. Ryan. 2.4-m f/8.9 Ritchey-Chretien + CCD.

H21 Astronomical Research Observatory, Westfield. Observer R. Holmes. Measurers T. Linder, R. Holmes, L. Horn. 0.76-m f/3.0 astrograph + CCD.

I52 Steward Observatory, Mt. Lemmon Station. Observer D. C. Fuls. Measurers E. J. Christensen, G. A. Farneth, D. C. Fuls, A. R. Gibbs, A. D. Grauer, H. Groeller, R. A. Kowalski, S. M. Larson, G. J. Leonard, D. Rankin, R. L. Seaman, F. C. Shelly, K. W. Wierzchos.

J57 Centro Astronomico Alto Turia, Valencia. Observer A. Fornas. Measurers A. Fornas, G. Fornas, E. Arce, V. Mas. 0.43-m f/6.8 reflector + CCD.

J69 North Observatory, Clanfield. Observer D. Briggs. 0.3-m f/5.4 Newtonian reflector + CCD.

J95 Great Shefford. Observer P. Birtwhistle. 0.41-m f/6.3 Schmidt-Cassegrain + CCD.

L18 QOS Observatory, Zalistci. Observers T. A. Bezluschenko, B. O. Basiev. Measurer A. M. Kozhukhov. 0.50-m f/3.8 reflector + CCD.

N51 GROWTH India Telescope, IAO, Hanle. Observers V. Swain, K. Sharma, H. Kumar, R. Norboo, V. Bhalerao, G. C. Anupama, S. Barway. Measurers V. Swain, K. Sharma. 0.70-m f/6.5 Corrected Dall-Kirkham + CCD.

V21 Cewanee Observatory at DSNM. Observer D. T. Durig. 0.4-m f/8 Ritchey-Chretien + 4656x3520 CCD.

V27 North Mesa Observatory, Los Alamos. Observer B. K. Kendrick. 0.25-m f/6 reflector + CCD.

Y00 SONEAR Observatory, Oliveira. Observer C. Jacques. 0.45-m f/2.9 reflector + CCD.

Orbital elements:

```
2021 XO2                                            Earth MOID = 0.0084 AU
Epoch 2022 Jan. 21.0 TT = JDT 2459600.5                Veres
M  37.78692             (2000.0)            P              Q
n   0.41372333     Peri.  297.37413     +0.97682160     -0.15597249
a   1.7837311      Node    71.90254     +0.20540835     +0.87570611
e   0.5421479      Incl.    8.87225     -0.06022436     +0.45695886
P   2.38           H   25.36          G   0.15           U   7
```

Residuals in seconds of arc

```
211204 703  0.6+  0.3-    211204 J95  0.1+  0.1-    211205 H21  0.1+  0.0
211204 703  0.6+  0.6+    211204 J57  0.6+  0.2-    211205 H21  0.2+  0.1-
211204 703  0.6+  0.5+    211204 J57  0.2+  0.2-    211205 033  0.1+  0.2+
211204 703  0.4-  0.6-    211204 C95  0.2-  0.1-    211205 033  0.0   0.0
211204 H01  0.1-  0.1-    211204 J57  0.4+  0.2+    211205 033  0.1+  0.1+
211204 H01  0.1-  0.0      211204 C95  0.3+  0.7+    211205 V27  0.7+  1.0+
211204 H01  0.0   0.0      211204 C95  0.4-  0.4+    211205 V27  4.0-  4.0+
211204 I52  0.0   0.1-     211204 C95  0.1+  0.0     211205 V27  0.4+  1.4+
211204 I52  0.0   0.2-     211204 C95  0.5-  0.3+    211205 V27  0.6-  0.6+
211204 I52  0.1-  0.1-     211204 B49  0.1-  0.4+    211205 V27  4.1+  1.6-
211204 I52  0.1-  0.1-     211204 B49  0.1-  0.2+    211205 I52  0.0   0.0
211204 H01  0.0   0.0      211204 B49  0.1-  0.3+    211205 I52  0.0   0.0
211204 718  0.8+  0.6+    211204 B49  0.0   0.2+    211205 I52  0.1+  0.1-
211204 718  0.3-  0.4+    211204 J69  0.0   0.1-    211205 I52  0.1-  0.0
211204 718  0.1-  1.4+    211204 J69  0.6+  0.7-    211205 V27  1.4+  0.0
211204 718  1.5-  1.3-    211204 J69  0.7-  0.0     211205 V27  1.7+  0.5-
211204 718  0.6-  0.1-    211204 C77  0.6+  0.1+    211205 718  0.4+  0.3+
211204 718  0.5-  0.6-    211204 C77  0.1+  0.3+    211205 718  0.9+  0.8+
211204 N51  0.9+  2.2+    211204 C77  0.2+  0.2-    211205 718  1.0+  0.5+
211204 N51  0.8+  2.8+    211205 Y00  0.0   0.3+    211205 V21  0.3-  0.3-
211204 L18 (1.9+  1.1+)   211205 Y00  0.2+  0.7+    211205 V21  0.1-  0.0
211204 L18 (2.1+  1.4+)   211205 Y00  0.1-  0.2-    211205 V21  0.1-  0.1-
211204 L18 (1.6+  2.2+)   211205 H21  0.0   0.1-    211205 V21  0.0   0.3+
211204 J95  0.1-  0.0      211205 H21  0.0   0.1-    211205 V21  0.2+  0.1+
211204 J95  0.0   0.0      211205 H21  0.2+  0.0
211204 J95  0.2-  0.4-     211205 H21  0.1+  0.1-
```

Ephemeris:

```
2021 XO2                a,e,i = 1.78, 0.54, 9                  q = 0.8167
Date    TT    R. A. (2000) Decl.     Delta      r    Elong.  Phase     V
2021 11 05    17 19 45.5 -43 49 46   0.2321  0.8403    44.0   124.9    27.1
```

```
...
2021 11 20    17 50 14.9 -47 55 00   0.1015  0.9108    38.5   137.6    26.7
...
2021 11 28    19 04 42.2 -54 37 58   0.03605 0.9620    46.1   132.4    24.0
...
2021 12 04    03 29 41.4 +14 57 27   0.01994 1.0046   161.7    18.0    17.8
2021 12 05    03 55 54.1 +23 51 31   0.02700 1.0120   168.6    11.1    18.2
2021 12 06    04 12 33.5 +28 49 45   0.03464 1.0195   169.5    10.1    18.8
...
2021 12 12    04 50 36.3 +37 57 56   0.08383 1.0655   164.1    14.6    20.9
...
2021 12 20    05 04 44.8 +40 10 58   0.1531  1.1294   160.6    16.8    22.4
...
2022 01 04    05 17 04.0 +40 17 22   0.2958  1.2531   152.5    21.3    24.2

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