Solar Cr appendix

Sun · Cr · downloadable appendix

Document	Solar Cr appendix
Subject	Solar photospheric abundance appendix · Cr
Author	Ryan Schmitt
Date	2026-11-15
Publisher	The Exoplanet Codex · exoplanetcodex.org
Version	feed v1.232
Source	science commit 24b2c041c24e
Web	https://exoplanetcodex.org/systems/sol/elements/cr/

Solar chromium: 5.684 ± 0.048

Asplund, Amarsi & Grevesse 2021: 5.62 ± 0.04 · this measurement +0.064 dex

Asplund, Amarsi & Grevesse (2021) give no line recipe we can repeat for this element, so this is our best HARPS product: the Reference Grade analysis with the most complete treatment, then the most lines.

VIS: 5.684 ± 0.048 · HARPS · VIS · Cr I · reference lines · <3D> LTE (Gerber)

Highlighted Products

near-UV

5.776 ± 0.053

Cr II · reference lines · <3D> LTE (Gerber) · Kitt Peak (1984, molecfit) · Reference Grade

VIS

5.655 ± 0.047

Cr I · reference lines · <3D> LTE (Gerber) · Kitt Peak (1984, molecfit) · Reference Grade

red-optical

5.758 ± 0.121

Cr I · reference lines · <3D> NLTE (Gerber) · Kitt Peak (Kurucz 2005) · Reference Grade

NIR

6.185 ± 0.077

Cr I · reference lines · <3D> LTE (Gerber) · Kitt Peak (Kurucz 2005) · Reference Grade

Line grades

Every product is measured on one of four grades of spectral lines and the grades are never mixed in one number.

Grade	What it means	This element
Reference Grade	lines from a published solar line set (Asplund et al. 2021 and similar), measured with the oscillator strengths the authors used	116 products -- Cr I · reference lines; Cr II · reference lines; SET-CR_AGSS21
Codex Grade	lines chosen by the Codex whose oscillator strength carries a published uncertainty (laboratory measurement, NIST accuracy class A-C, or the paper's own stated error), between 5% and 60% deep	81 products -- Cr I · Codex-graded lines; Cr II · Codex-graded lines

Grade	What it means	This element
Deep Grade	the same oscillator-strength rule on lines deeper than 60% -- stronger lines, more sensitive to damping and the model atmosphere	none for the Sun: every line in this grade is excluded as saturated or an outlier (see Excluded lines)
Theoretical Codex	lines whose oscillator strength comes from atomic theory, calculated rather than measured in a laboratory and with no published uncertainty, adopted by name after review. Shown on their own and never used for the headline value	30 products -- SET-CR_ELGUETA2026

Error-bar Forest Plot

near-UV — Kitt Peak (Kurucz 2005)
A(Cr) dex; axis 5.50–6.27

Cr II · Codex-graded lines · 1D LTE Codex Grade · 27 lines		6.003 ±0.096
Cr II · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 24 lines		5.986 ±0.084
Cr II · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 27 lines		6.026 ±0.090
Cr II · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 29 lines · EXPERIMENTAL-NOT-ADOPTED		6.149 ±0.087
Cr II · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 24 lines · EXPERIMENTAL-NOT-ADOPTED		6.135 ±0.084
Cr II · reference lines · 1D LTE Reference Grade · 113 lines		5.937 ±0.057
Cr II · reference lines · 1D NLTE (Gerber) Reference Grade · 96 lines		5.887 ±0.051
Cr II · reference lines · 1D LTE (Gerber) Reference Grade · 113 lines		5.931 ±0.056
Cr II · reference lines · <3D> LTE (Gerber) Reference Grade · 112 lines · EXPERIMENTAL-NOT-ADOPTED		6.127 ±0.052
Cr II · reference lines · <3D> NLTE (Gerber) Reference Grade · 92 lines · EXPERIMENTAL-NOT-ADOPTED		6.049 ±0.049
Cr I · Codex-graded lines · 1D LTE Codex Grade · 2 lines		5.843 ±0.064
Cr I · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 3 lines		5.966 ±0.042
Cr I · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 2 lines		5.894 ±0.054
Cr I · reference lines · 1D LTE Reference Grade · 26 lines		5.817 ±0.113
Cr I · reference lines · 1D NLTE (Gerber) Reference Grade · 25 lines		5.897 ±0.096
Cr I · reference lines · 1D LTE (Gerber) Reference Grade · 26 lines		5.865 ±0.102
Cr I · reference lines · <3D> LTE (Gerber) Reference Grade · 25 lines · EXPERIMENTAL-NOT-ADOPTED		6.118 ±0.086

near-UV — Kitt Peak (Kurucz 2005)
A(Cr) dex; axis 5.50–6.27

Cr I · reference lines · <3D> NLTE (Gerber) Reference Grade · 21 lines · EXPERIMENTAL-NOT-ADOPTED		6.065 ±0.072

near-UV — Kitt Peak (1984, molecfit)
A(Cr) dex; axis 5.50–6.27

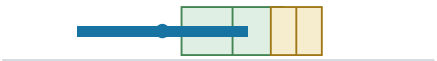
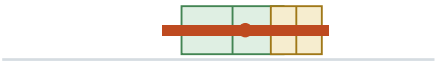
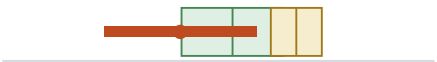
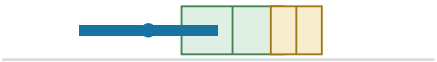
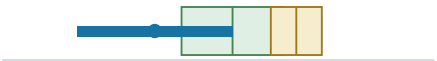
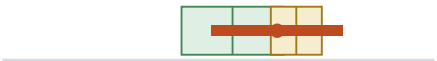
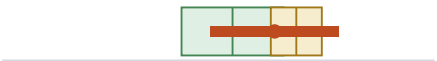
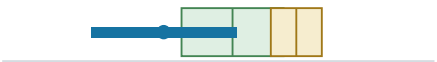
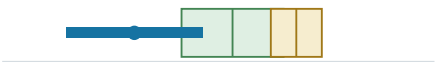
Cr II · Codex-graded lines · 1D LTE Codex Grade · 23 lines		5.866 ±0.097
Cr II · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 23 lines		5.819 ±0.095
Cr II · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 24 lines		5.858 ±0.095
Cr II · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 28 lines · EXPERIMENTAL-NOT-ADOPTED		5.881 ±0.104
Cr II · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 27 lines · EXPERIMENTAL-NOT-ADOPTED		5.925 ±0.089
Cr II · reference lines · 1D LTE Reference Grade · 110 lines		5.640 ±0.057
Cr II · reference lines · 1D NLTE (Gerber) Reference Grade · 98 lines		5.661 ±0.052
Cr II · reference lines · 1D LTE (Gerber) Reference Grade · 110 lines		5.626 ±0.056
Cr II · reference lines · <3D> LTE (Gerber) Reference Grade · 117 lines · EXPERIMENTAL-NOT-ADOPTED		5.776 ±0.053
Cr II · reference lines · <3D> NLTE (Gerber) Reference Grade · 104 lines · EXPERIMENTAL-NOT-ADOPTED		5.813 ±0.050
Cr I · Codex-graded lines · 1D LTE Codex Grade · 4 lines		5.717 ±0.090
Cr I · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 3 lines		5.757 ±0.051
Cr I · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 4 lines		5.736 ±0.074
Cr I · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 4 lines · EXPERIMENTAL-NOT-ADOPTED		5.966 ±0.060
Cr I · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 3 lines · EXPERIMENTAL-NOT-ADOPTED		5.965 ±0.047
Cr I · reference lines · 1D LTE Reference Grade · 25 lines		5.623 ±0.097

near-UV — Kitt Peak (1984, molecfit)
A(Cr) dex; axis 5.50–6.27

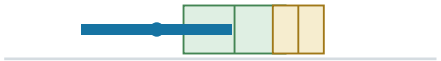
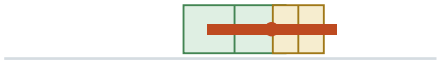
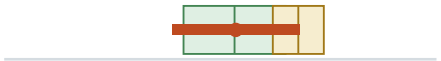
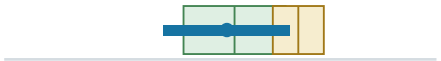
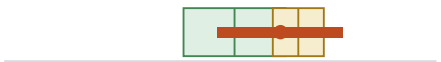
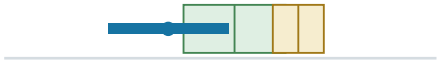
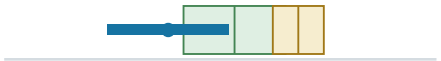
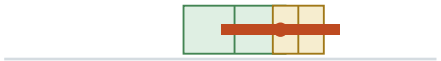
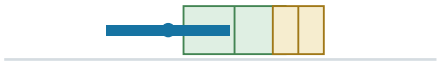
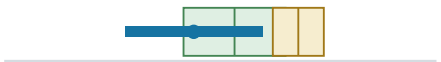
Cr I · reference lines · 1D NLTE (Gerber) Reference Grade · 23 lines		5.736 ±0.086
Cr I · reference lines · 1D LTE (Gerber) Reference Grade · 25 lines		5.657 ±0.097
Cr I · reference lines · <3D> LTE (Gerber) Reference Grade · 26 lines · EXPERIMENTAL-NOT-ADOPTED		5.780 ±0.086
Cr I · reference lines · <3D> NLTE (Gerber) Reference Grade · 25 lines · EXPERIMENTAL-NOT-ADOPTED		5.801 ±0.087

near-UV axis: 5.50 · 5.69 · 5.88 · 6.07 · 6.27 A(Cr) dex

VIS — HARPS
A(Cr) dex; axis 5.44–5.78

SET-CR_AGSS21 · 1D LTE Reference Grade · 8 lines		5.565 ±0.067
SET-CR_AGSS21 · 1D NLTE (Gerber) Reference Grade · 8 lines		5.527 ±0.058
SET-CR_AGSS21 · 1D LTE (Gerber) Reference Grade · 8 lines		5.544 ±0.065
SET-CR_AGSS21 · <3D> LTE (Gerber) Reference Grade · 8 lines · EXPERIMENTAL-NOT-ADOPTED		5.630 ±0.065
SET-CR_AGSS21 · <3D> NLTE (Gerber) Reference Grade · 8 lines · EXPERIMENTAL-NOT-ADOPTED		5.579 ±0.060
Cr II · Codex-graded lines · 1D LTE Codex Grade · 38 lines		5.566 ±0.059
Cr II · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 37 lines		5.554 ±0.054
Cr II · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 38 lines		5.559 ±0.061
Cr II · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 38 lines · EXPERIMENTAL-NOT-ADOPTED		5.655 ±0.052
Cr II · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 38 lines · EXPERIMENTAL-NOT-ADOPTED		5.653 ±0.050
Cr II · reference lines · 1D LTE Reference Grade · 42 lines		5.566 ±0.057
Cr II · reference lines · 1D NLTE (Gerber) Reference Grade · 41 lines		5.543 ±0.054

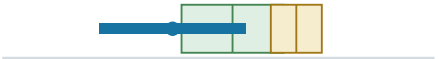
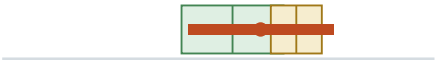
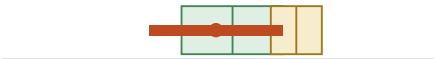
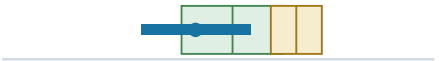
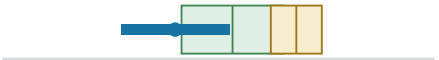
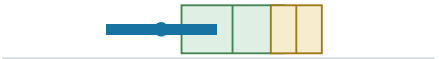
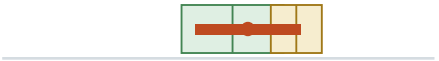
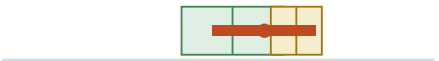
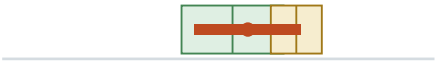
VIS — HARPS
A(Cr) dex; axis 5.44–5.78

Cr II · reference lines · 1D LTE (Gerber) Reference Grade · 42 lines		5.559 ±0.059
Cr II · reference lines · <3D> LTE (Gerber) Reference Grade · 42 lines · EXPERIMENTAL-NOT-ADOPTED		5.649 ±0.051
Cr II · reference lines · <3D> NLTE (Gerber) Reference Grade · 42 lines · EXPERIMENTAL-NOT-ADOPTED		5.621 ±0.050
SET-CR_AGSS21 · 1D LTE Reference Grade · 26 lines		5.555 ±0.049
SET-CR_AGSS21 · 1D NLTE (Bergemann) Reference Grade · 5 lines		5.609 ±0.105
SET-CR_AGSS21 · 1D NLTE (Gerber) Reference Grade · 26 lines		5.614 ±0.050
SET-CR_AGSS21 · 1D LTE (Gerber) Reference Grade · 26 lines		5.562 ±0.049
SET-CR_AGSS21 · <3D> LTE (Gerber) Reference Grade · 26 lines · EXPERIMENTAL-NOT-ADOPTED		5.625 ±0.049
SET-CR_AGSS21 · <3D> NLTE (Gerber) Reference Grade · 26 lines · EXPERIMENTAL-NOT-ADOPTED		5.656 ±0.049
Cr I · Codex-graded lines · 1D LTE Codex Grade · 104 lines		5.568 ±0.047
Cr I · Codex-graded lines · 1D NLTE (Bergemann) Codex Grade · 13 lines		5.623 ±0.059
Cr I · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 101 lines		5.629 ±0.046
Cr I · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 105 lines		5.568 ±0.048
Cr I · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 107 lines · EXPERIMENTAL-NOT-ADOPTED		5.656 ±0.046
Cr I · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 104 lines · EXPERIMENTAL-NOT-ADOPTED		5.693 ±0.046
Cr I · reference lines · 1D LTE Reference Grade · 121 lines		5.568 ±0.048
Cr I · reference lines · 1D NLTE (Bergemann) Reference Grade · 11 lines		5.588 ±0.054
Cr I · reference lines · 1D NLTE (Gerber) Reference Grade · 117 lines		5.622 ±0.047

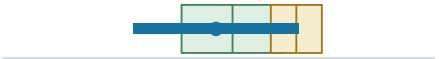
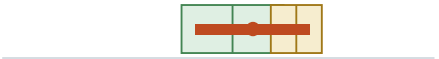
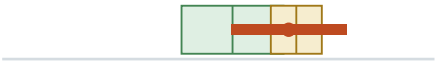
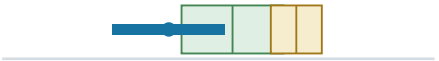
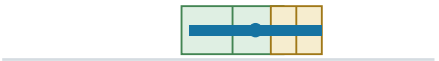
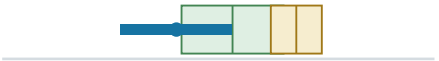
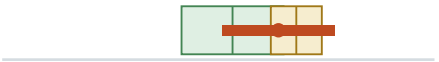
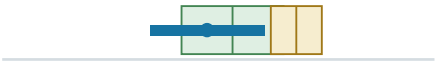
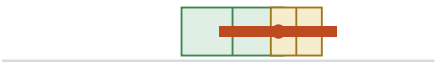
VIS — HARPS
A(Cr) dex; axis 5.44–5.78

Cr I · reference lines · 1D LTE (Gerber) Reference Grade · 122 lines		5.572 ±0.049
Cr I · reference lines · <3D> LTE (Gerber) Reference Grade · 124 lines · EXPERIMENTAL-NOT-ADOPTED		5.684 ±0.048
Cr I · reference lines · <3D> NLTE (Gerber) Reference Grade · 120 lines · EXPERIMENTAL-NOT-ADOPTED		5.697 ±0.047

VIS — Kitt Peak (Kurucz 2005)
A(Cr) dex; axis 5.44–5.78

SET-CR_AGSS21 · 1D LTE Reference Grade · 10 lines		5.595 ±0.059
SET-CR_AGSS21 · 1D NLTE (Gerber) Reference Grade · 10 lines		5.530 ±0.053
SET-CR_AGSS21 · 1D LTE (Gerber) Reference Grade · 10 lines		5.573 ±0.057
SET-CR_AGSS21 · <3D> LTE (Gerber) Reference Grade · 10 lines · EXPERIMENTAL-NOT-ADOPTED		5.642 ±0.057
SET-CR_AGSS21 · <3D> NLTE (Gerber) Reference Grade · 10 lines · EXPERIMENTAL-NOT-ADOPTED		5.607 ±0.052
Cr II · Codex-graded lines · 1D LTE Codex Grade · 45 lines		5.591 ±0.043
Cr II · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 45 lines		5.575 ±0.042
Cr II · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 45 lines		5.564 ±0.043
Cr II · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 45 lines · EXPERIMENTAL-NOT-ADOPTED		5.632 ±0.041
Cr II · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 45 lines · EXPERIMENTAL-NOT-ADOPTED		5.645 ±0.041
Cr II · reference lines · 1D LTE Reference Grade · 49 lines		5.591 ±0.044
Cr II · reference lines · 1D NLTE (Gerber) Reference Grade · 49 lines		5.553 ±0.043
Cr II · reference lines · 1D LTE (Gerber) Reference Grade · 49 lines		5.564 ±0.044
Cr II · reference lines · <3D> LTE (Gerber) Reference Grade · 49 lines · EXPERIMENTAL-NOT-ADOPTED		5.632 ±0.042

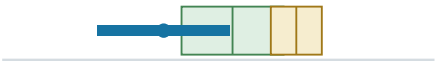
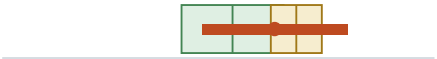
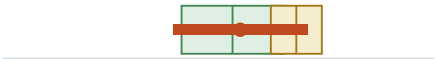
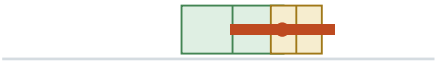
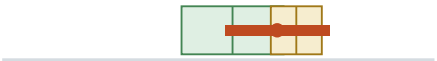
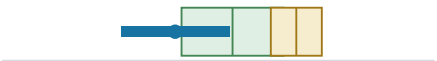
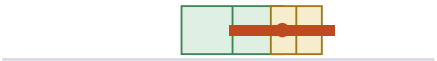
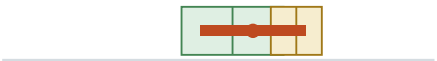
VIS — Kitt Peak (Kurucz 2005)
A(Cr) dex; axis 5.44–5.78

Cr II · reference lines · <3D> NLTE (Gerber) Reference Grade · 49 lines · EXPERIMENTAL-NOT-ADOPTED		5.625 ±0.041
SET-CR_AGSS21 · 1D LTE Reference Grade · 29 lines		5.559 ±0.045
SET-CR_AGSS21 · 1D NLTE (Bergemann) Reference Grade · 5 lines		5.607 ±0.065
SET-CR_AGSS21 · 1D NLTE (Gerber) Reference Grade · 29 lines		5.609 ±0.046
SET-CR_AGSS21 · 1D LTE (Gerber) Reference Grade · 29 lines		5.565 ±0.045
SET-CR_AGSS21 · <3D> LTE (Gerber) Reference Grade · 29 lines · EXPERIMENTAL-NOT-ADOPTED		5.636 ±0.045
SET-CR_AGSS21 · <3D> NLTE (Gerber) Reference Grade · 29 lines · EXPERIMENTAL-NOT-ADOPTED		5.664 ±0.045
Cr I · Codex-graded lines · 1D LTE Codex Grade · 109 lines		5.570 ±0.044
Cr I · Codex-graded lines · 1D NLTE (Bergemann) Codex Grade · 13 lines		5.638 ±0.052
Cr I · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 106 lines		5.628 ±0.043
Cr I · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 109 lines		5.576 ±0.044
Cr I · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 113 lines · EXPERIMENTAL-NOT-ADOPTED		5.656 ±0.044
Cr I · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 110 lines · EXPERIMENTAL-NOT-ADOPTED		5.693 ±0.044
Cr I · reference lines · 1D LTE Reference Grade · 121 lines		5.542 ±0.046
Cr I · reference lines · 1D NLTE (Bergemann) Reference Grade · 11 lines		5.636 ±0.052
Cr I · reference lines · 1D NLTE (Gerber) Reference Grade · 117 lines		5.600 ±0.045
Cr I · reference lines · 1D LTE (Gerber) Reference Grade · 121 lines		5.554 ±0.046
Cr I · reference lines · <3D> LTE (Gerber) Reference Grade · 125 lines · EXPERIMENTAL-NOT-ADOPTED		5.656 ±0.046

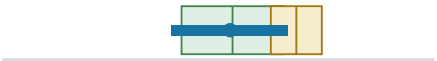
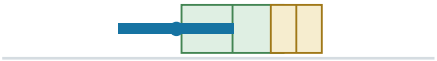
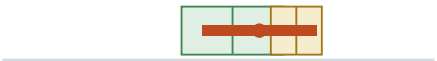
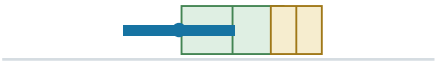
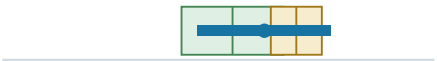
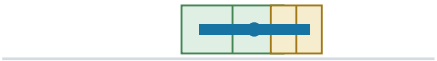
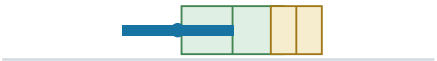
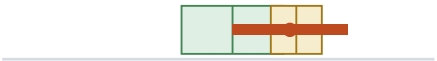
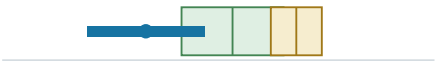
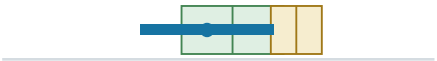
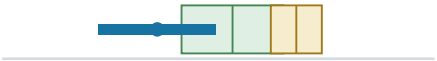
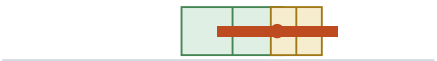
VIS — Kitt Peak (Kurucz 2005)
A(Cr) dex; axis 5.44–5.78

Cr I · reference lines · <3D> NLTE (Gerber) Reference Grade · 121 lines · EXPERIMENTAL-NOT-ADOPTED		5.685 ±0.045

VIS — Kitt Peak (1984, molecfit)
A(Cr) dex; axis 5.44–5.78

SET-CR_AGSS21 · 1D LTE Reference Grade · 10 lines		5.610 ±0.058
SET-CR_AGSS21 · 1D NLTE (Gerber) Reference Grade · 10 lines		5.566 ±0.052
SET-CR_AGSS21 · 1D LTE (Gerber) Reference Grade · 10 lines		5.588 ±0.057
SET-CR_AGSS21 · <3D> LTE (Gerber) Reference Grade · 10 lines · EXPERIMENTAL-NOT-ADOPTED		5.653 ±0.057
SET-CR_AGSS21 · <3D> NLTE (Gerber) Reference Grade · 10 lines · EXPERIMENTAL-NOT-ADOPTED		5.626 ±0.053
Cr II · Codex-graded lines · 1D LTE Codex Grade · 45 lines		5.603 ±0.043
Cr II · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 45 lines		5.585 ±0.042
Cr II · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 45 lines		5.579 ±0.043
Cr II · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 45 lines · EXPERIMENTAL-NOT-ADOPTED		5.659 ±0.041
Cr II · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 45 lines · EXPERIMENTAL-NOT-ADOPTED		5.655 ±0.041
Cr II · reference lines · 1D LTE Reference Grade · 49 lines		5.603 ±0.043
Cr II · reference lines · 1D NLTE (Gerber) Reference Grade · 49 lines		5.575 ±0.043
Cr II · reference lines · 1D LTE (Gerber) Reference Grade · 49 lines		5.579 ±0.043
Cr II · reference lines · <3D> LTE (Gerber) Reference Grade · 49 lines · EXPERIMENTAL-NOT-ADOPTED		5.659 ±0.041
Cr II · reference lines · <3D> NLTE (Gerber) Reference Grade · 49 lines · EXPERIMENTAL-NOT-ADOPTED		5.636 ±0.041
SET-CR_AGSS21 · 1D LTE Reference Grade · 29 lines		5.570 ±0.045

VIS — Kitt Peak (1984, molecfit)
A(Cr) dex; axis 5.44–5.78

SET-CR_AGSS21 · 1D NLTE (Bergemann) Reference Grade · 5 lines		5.611 ±0.068
SET-CR_AGSS21 · 1D NLTE (Gerber) Reference Grade · 29 lines		5.618 ±0.046
SET-CR_AGSS21 · 1D LTE (Gerber) Reference Grade · 29 lines		5.576 ±0.045
SET-CR_AGSS21 · <3D> LTE (Gerber) Reference Grade · 29 lines · EXPERIMENTAL-NOT-ADOPTED		5.641 ±0.045
SET-CR_AGSS21 · <3D> NLTE (Gerber) Reference Grade · 29 lines · EXPERIMENTAL-NOT-ADOPTED		5.675 ±0.045
Cr I · Codex-graded lines · 1D LTE Codex Grade · 109 lines		5.578 ±0.044
Cr I · Codex-graded lines · 1D NLTE (Bergemann) Codex Grade · 13 lines		5.645 ±0.053
Cr I · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 106 lines		5.637 ±0.043
Cr I · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 109 lines		5.577 ±0.044
Cr I · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 114 lines · EXPERIMENTAL-NOT-ADOPTED		5.665 ±0.045
Cr I · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 111 lines · EXPERIMENTAL-NOT-ADOPTED		5.704 ±0.044
Cr I · reference lines · 1D LTE Reference Grade · 121 lines		5.552 ±0.046
Cr I · reference lines · 1D NLTE (Bergemann) Reference Grade · 11 lines		5.600 ±0.052
Cr I · reference lines · 1D NLTE (Gerber) Reference Grade · 117 lines		5.607 ±0.045
Cr I · reference lines · 1D LTE (Gerber) Reference Grade · 121 lines		5.561 ±0.046
Cr I · reference lines · <3D> LTE (Gerber) Reference Grade · 126 lines · EXPERIMENTAL-NOT-ADOPTED		5.655 ±0.047
Cr I · reference lines · <3D> NLTE (Gerber) Reference Grade · 122 lines · EXPERIMENTAL-NOT-ADOPTED		5.689 ±0.046

VIS axis: 5.44 · 5.52 · 5.61 · 5.69 · 5.78 A(Cr) dex

red-optical — IAG FTS
A(Cr) dex; axis 5.49–5.97

Cr I · Codex-graded lines · 1D LTE Codex Grade · 7 lines		5.678 ±0.103
Cr I · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 7 lines		5.729 ±0.095
Cr I · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 7 lines		5.681 ±0.101
Cr I · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 7 lines · EXPERIMENTAL-NOT-ADOPTED		5.762 ±0.098
Cr I · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 7 lines · EXPERIMENTAL-NOT-ADOPTED		5.784 ±0.091
Cr I · reference lines · 1D LTE Reference Grade · 4 lines		5.697 ±0.177
Cr I · reference lines · 1D NLTE (Gerber) Reference Grade · 4 lines		5.729 ±0.162
Cr I · reference lines · 1D LTE (Gerber) Reference Grade · 4 lines		5.702 ±0.173
Cr I · reference lines · <3D> LTE (Gerber) Reference Grade · 4 lines · EXPERIMENTAL-NOT-ADOPTED		5.758 ±0.169
Cr I · reference lines · <3D> NLTE (Gerber) Reference Grade · 4 lines · EXPERIMENTAL-NOT-ADOPTED		5.761 ±0.156

red-optical — Kitt Peak (Kurucz 2005)
A(Cr) dex; axis 5.49–5.97

Cr I · Codex-graded lines · 1D LTE Codex Grade · 7 lines		5.669 ±0.081
Cr I · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 7 lines		5.716 ±0.076
Cr I · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 7 lines		5.672 ±0.081
Cr I · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 7 lines · EXPERIMENTAL-NOT-ADOPTED		5.753 ±0.077
Cr I · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 7 lines · EXPERIMENTAL-NOT-ADOPTED		5.775 ±0.074
Cr I · reference lines · 1D LTE Reference Grade · 4 lines		5.697 ±0.134
Cr I · reference lines · 1D NLTE (Gerber) Reference Grade · 4 lines		5.718 ±0.123

red-optical — Kitt Peak (Kurucz 2005)
A(Cr) dex; axis 5.49–5.97

Cr I · reference lines · 1D LTE (Gerber) Reference Grade · 4 lines		5.703 ±0.133
Cr I · reference lines · <3D> LTE (Gerber) Reference Grade · 4 lines · EXPERIMENTAL-NOT-ADOPTED		5.760 ±0.126
Cr I · reference lines · <3D> NLTE (Gerber) Reference Grade · 4 lines · EXPERIMENTAL-NOT-ADOPTED		5.758 ±0.121

red-optical — Kitt Peak (1984, molecfit)
A(Cr) dex; axis 5.49–5.97

Cr I · Codex-graded lines · 1D LTE Codex Grade · 7 lines		5.678 ±0.088
Cr I · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 7 lines		5.740 ±0.082
Cr I · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 7 lines		5.681 ±0.088
Cr I · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 7 lines · EXPERIMENTAL-NOT-ADOPTED		5.770 ±0.085
Cr I · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 7 lines · EXPERIMENTAL-NOT-ADOPTED		5.804 ±0.081
Cr I · reference lines · 1D LTE Reference Grade · 4 lines		5.737 ±0.144
Cr I · reference lines · 1D NLTE (Gerber) Reference Grade · 4 lines		5.762 ±0.133
Cr I · reference lines · 1D LTE (Gerber) Reference Grade · 4 lines		5.743 ±0.142
Cr I · reference lines · <3D> LTE (Gerber) Reference Grade · 4 lines · EXPERIMENTAL-NOT-ADOPTED		5.800 ±0.137
Cr I · reference lines · <3D> NLTE (Gerber) Reference Grade · 4 lines · EXPERIMENTAL-NOT-ADOPTED		5.792 ±0.133

red-optical axis: 5.49 · 5.61 · 5.73 · 5.85 · 5.97 A(Cr) dex

NIR — CRIRES+ J
A(Cr) dex; axis 5.43–6.40

SET-CR_ELGUETA2026 · 1D LTE Theoretical Codex · 2 lines		5.528 ±0.068
SET-CR_ELGUETA2026 · 1D NLTE (Gerber) Theoretical Codex · 2 lines		5.510 ±0.043

NIR — CRIRES+ J
A(Cr) dex; axis 5.43–6.40

SET-CR_ELGUETA2026 · 1D LTE (Gerber) Theoretical Codex · 2 lines		5.537 ±0.068
SET-CR_ELGUETA2026 · <3D> LTE (Gerber) Theoretical Codex · 2 lines · EXPERIMENTAL-NOT-ADOPTED		5.596 ±0.067
SET-CR_ELGUETA2026 · <3D> NLTE (Gerber) Theoretical Codex · 2 lines · EXPERIMENTAL-NOT-ADOPTED		5.615 ±0.065

NIR — CRIRES+ Y
A(Cr) dex; axis 5.43–6.40

SET-CR_ELGUETA2026 · 1D LTE Theoretical Codex · 4 lines		5.542 ±0.068
SET-CR_ELGUETA2026 · 1D NLTE (Gerber) Theoretical Codex · 4 lines		5.593 ±0.065
SET-CR_ELGUETA2026 · 1D LTE (Gerber) Theoretical Codex · 4 lines		5.549 ±0.068
SET-CR_ELGUETA2026 · <3D> LTE (Gerber) Theoretical Codex · 4 lines · EXPERIMENTAL-NOT-ADOPTED		5.608 ±0.068
SET-CR_ELGUETA2026 · <3D> NLTE (Gerber) Theoretical Codex · 4 lines · EXPERIMENTAL-NOT-ADOPTED		5.635 ±0.064

NIR — CRIRES+ Y (full arm)
A(Cr) dex; axis 5.43–6.40

SET-CR_ELGUETA2026 · 1D LTE Theoretical Codex · 5 lines		5.548 ±0.059
SET-CR_ELGUETA2026 · 1D NLTE (Gerber) Theoretical Codex · 5 lines		5.604 ±0.057
SET-CR_ELGUETA2026 · 1D LTE (Gerber) Theoretical Codex · 5 lines		5.554 ±0.059
SET-CR_ELGUETA2026 · <3D> LTE (Gerber) Theoretical Codex · 5 lines · EXPERIMENTAL-NOT-ADOPTED		5.606 ±0.059
SET-CR_ELGUETA2026 · <3D> NLTE (Gerber) Theoretical Codex · 5 lines · EXPERIMENTAL-NOT-ADOPTED		5.638 ±0.056

NIR — IAG FTS
A(Cr) dex; axis 5.43–6.40

SET-CR_ELGUETA2026 · 1D LTE Theoretical Codex · 1 line		5.718 ±0.070

NIR — IAG FTS
A(Cr) dex; axis 5.43–6.40

SET-CR_ELGUETA2026 · 1D NLTE (Gerber) Theoretical Codex · 1 line		5.761 ±0.217
SET-CR_ELGUETA2026 · 1D LTE (Gerber) Theoretical Codex · 1 line		5.724 ±0.070
SET-CR_ELGUETA2026 · <3D> LTE (Gerber) Theoretical Codex · 1 line · EXPERIMENTAL-NOT-ADOPTED		5.777 ±0.071
SET-CR_ELGUETA2026 · <3D> NLTE (Gerber) Theoretical Codex · 1 line · EXPERIMENTAL-NOT-ADOPTED		5.791 ±0.275
Cr I · Codex-graded lines · 1D LTE Codex Grade · 6 lines		6.181 ±0.106
Cr I · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 6 lines		6.170 ±0.102
Cr I · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 6 lines		6.185 ±0.106
Cr I · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 6 lines · EXPERIMENTAL-NOT-ADOPTED		6.263 ±0.108
Cr I · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 6 lines · EXPERIMENTAL-NOT-ADOPTED		6.232 ±0.105
Cr I · reference lines · 1D LTE Reference Grade · 6 lines		6.181 ±0.106
Cr I · reference lines · 1D NLTE (Gerber) Reference Grade · 6 lines		6.170 ±0.102
Cr I · reference lines · 1D LTE (Gerber) Reference Grade · 6 lines		6.185 ±0.106
Cr I · reference lines · <3D> LTE (Gerber) Reference Grade · 6 lines · EXPERIMENTAL-NOT-ADOPTED		6.263 ±0.108
Cr I · reference lines · <3D> NLTE (Gerber) Reference Grade · 6 lines · EXPERIMENTAL-NOT-ADOPTED		6.232 ±0.105

NIR — Kitt Peak (Kurucz 2005)
A(Cr) dex; axis 5.43–6.40

SET-CR_ELGUETA2026 · 1D LTE Theoretical Codex · 1 line		5.662 ±0.059
SET-CR_ELGUETA2026 · 1D NLTE (Gerber) Theoretical Codex · 1 line		5.712 ±0.163
SET-CR_ELGUETA2026 · 1D LTE (Gerber) Theoretical Codex · 1 line		5.669 ±0.059

NIR — Kitt Peak (Kurucz 2005)
A(Cr) dex; axis 5.43–6.40

SET-CR_ELGUETA2026 · <3D> LTE (Gerber) Theoretical Codex · 1 line · EXPERIMENTAL-NOT-ADOPTED		5.721 ±0.059
SET-CR_ELGUETA2026 · <3D> NLTE (Gerber) Theoretical Codex · 1 line · EXPERIMENTAL-NOT-ADOPTED		5.747 ±0.164
Cr I · Codex-graded lines · 1D LTE Codex Grade · 8 lines		6.110 ±0.076
Cr I · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 8 lines		6.103 ±0.076
Cr I · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 8 lines		6.115 ±0.076
Cr I · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 8 lines · EXPERIMENTAL-NOT-ADOPTED		6.185 ±0.077
Cr I · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 8 lines · EXPERIMENTAL-NOT-ADOPTED		6.165 ±0.077
Cr I · reference lines · 1D LTE Reference Grade · 8 lines		6.110 ±0.076
Cr I · reference lines · 1D NLTE (Gerber) Reference Grade · 8 lines		6.103 ±0.076
Cr I · reference lines · 1D LTE (Gerber) Reference Grade · 8 lines		6.115 ±0.076
Cr I · reference lines · <3D> LTE (Gerber) Reference Grade · 8 lines · EXPERIMENTAL-NOT-ADOPTED		6.185 ±0.077
Cr I · reference lines · <3D> NLTE (Gerber) Reference Grade · 8 lines · EXPERIMENTAL-NOT-ADOPTED		6.165 ±0.077

NIR — Kitt Peak (1984, molecfit)
A(Cr) dex; axis 5.43–6.40

SET-CR_ELGUETA2026 · 1D LTE Theoretical Codex · 7 lines		5.533 ±0.069
SET-CR_ELGUETA2026 · 1D NLTE (Gerber) Theoretical Codex · 7 lines		5.579 ±0.066
SET-CR_ELGUETA2026 · 1D LTE (Gerber) Theoretical Codex · 7 lines		5.541 ±0.069
SET-CR_ELGUETA2026 · <3D> LTE (Gerber) Theoretical Codex · 7 lines · EXPERIMENTAL-NOT-ADOPTED		5.596 ±0.069

NIR — Kitt Peak (1984, molecfit)
A(Cr) dex; axis 5.43–6.40

SET-CR_ELGUETA2026 · <3D> NLTE (Gerber) Theoretical Codex · 7 lines · EXPERIMENTAL-NOT-ADOPTED		5.618 ±0.067
Cr I · Codex-graded lines · 1D LTE Codex Grade · 6 lines		6.107 ±0.067
Cr I · Codex-graded lines · 1D NLTE (Gerber) Codex Grade · 6 lines		6.103 ±0.067
Cr I · Codex-graded lines · 1D LTE (Gerber) Codex Grade · 6 lines		6.115 ±0.067
Cr I · Codex-graded lines · <3D> LTE (Gerber) Codex Grade · 6 lines · EXPERIMENTAL-NOT-ADOPTED		6.180 ±0.068
Cr I · Codex-graded lines · <3D> NLTE (Gerber) Codex Grade · 6 lines · EXPERIMENTAL-NOT-ADOPTED		6.158 ±0.068
Cr I · reference lines · 1D LTE Reference Grade · 6 lines		6.107 ±0.067
Cr I · reference lines · 1D NLTE (Gerber) Reference Grade · 6 lines		6.103 ±0.067
Cr I · reference lines · 1D LTE (Gerber) Reference Grade · 6 lines		6.115 ±0.067
Cr I · reference lines · <3D> LTE (Gerber) Reference Grade · 6 lines · EXPERIMENTAL-NOT-ADOPTED		6.180 ±0.068
Cr I · reference lines · <3D> NLTE (Gerber) Reference Grade · 6 lines · EXPERIMENTAL-NOT-ADOPTED		6.158 ±0.068

NIR axis: 5.43 · 5.67 · 5.92 · 6.16 · 6.40 A(Cr) dex

How to read this forest. Each row is one independent product, preserving its band, holding, engine, indicator and line set. Engines and indicator families are never averaged. Each bar is the uncertainty as Asplund et al. 2021 quote it: line-to-line scatter, the 3D-model term and the NLTE term (at least 0.03 dex). For a molecule the NLTE term is replaced by its dependence on the other element, and the 3D term comes from the 3D-to-1D difference Amarsi et al. 2021 publish for the same band. Atomic-data and observational terms are not in the bar, as in Asplund; they stay in the full error budget attached to the row. Grades describe the supplied line-pool provenance, not engine quality; evaluated theoretical CNO oscillator strengths are not relabelled as laboratory evidence. Quarantined, failed and unconstrained fits have no abundance mark. Experimental products remain explicitly not adopted. Literature references provide context, never tuning targets.

How this was measured

Every chromium value on this page comes from fitting synthetic spectra to the observed solar spectrum, line by line or band by band, with the chromium abundance as the free parameter. The synthesis includes the atomic lines and the molecular opacity in every window, so blended absorption is modelled rather than attributed to the line being measured. The continuum is placed locally around every line by comparing the observation with the synthesis on its own highest pixels, and ground-based spectra are telluric-corrected across their full range.

Each indicator is measured independently on each solar spectrum and reported separately; nothing is averaged across indicators or instruments. Where a 3D or NLTE correction is published for the lines, it is applied as its own product (1D-LTE, 1D-NLTE and 3D-NLTE are separate rows). Every value carries a full uncertainty budget: fit, line strengths, microturbulence, continuum, fit window, model atmosphere, telluric residual, and the spread between spectra, each measured by refitting with that one input changed. The headline at the top is the Asplund-grade product: a published line set, the most complete treatment, then the most lines.

Band	near-UV
What was measured	Cr I · Codex-graded lines; Cr II · Codex-graded lines
Solar spectra	Kitt Peak (1984, molecfit), Kitt Peak (Kurucz 2005)
Treatments	1D-LTE, 1D-NLTE, synth-mean3D-LTE-gerber-stagger, synth-mean3D-NLTE-gerber-stagger
Lines	2–29
Result A(Cr)	5.881–6.149 (synth-mean3D-LTE-gerber-stagger)
Largest uncertainty terms (dex)	fit / line-to-line scatter 0.08, line strengths (gf) 0.04

Band	near-UV
What was measured	Cr I · reference lines; Cr II · reference lines
Solar spectra	Kitt Peak (1984, molecfit), Kitt Peak (Kurucz 2005)
Treatments	1D-LTE, 1D-NLTE, synth-mean3D-LTE-gerber-stagger, synth-mean3D-NLTE-gerber-stagger
Lines	21–117
Result A(Cr)	5.776–6.127 (synth-mean3D-LTE-gerber-stagger)
Largest uncertainty terms (dex)	fit / line-to-line scatter 0.04, line strengths (gf) 0.02

Band	VIS
What was measured	Cr I · Codex-graded lines; Cr II · Codex-graded lines
Solar spectra	HARPS, Kitt Peak (1984, molecfit), Kitt Peak (Kurucz 2005)
Treatments	1D-LTE, 1D-NLTE, synth-mean3D-LTE-gerber-stagger, synth-mean3D-NLTE-gerber-stagger
Lines	13–114
Result A(Cr)	5.632–5.665 (synth-mean3D-LTE-gerber-stagger)
Largest uncertainty terms (dex)	model atmosphere 0.03, fit / line-to-line scatter 0.02

Band	VIS
What was measured	Cr I · reference lines; Cr II · reference lines
Solar spectra	HARPS, Kitt Peak (1984, molecfit), Kitt Peak (Kurucz 2005)
Treatments	1D-LTE, 1D-NLTE, synth-mean3D-LTE-gerber-stagger, synth-mean3D-NLTE-gerber-stagger
Lines	11–126
Result A(Cr)	5.632–5.684 (synth-mean3D-LTE-gerber-stagger)
Largest uncertainty terms (dex)	model atmosphere 0.03, fit / line-to-line scatter 0.02

Band	VIS
What was measured	SET-CR_AGSS21
Solar spectra	HARPS, Kitt Peak (1984, molecfit), Kitt Peak (Kurucz 2005)

Band	VIS
What was measured	SET-CR_AGSS21
Treatments	1D-LTE, 1D-NLTE, synth-mean3D-LTE-gerber-stagger, synth-mean3D-NLTE-gerber-stagger
Lines	5–29
Result A(Cr)	5.625–5.653 (synth-mean3D-LTE-gerber-stagger)
Largest uncertainty terms (dex)	model atmosphere 0.03, fit / line-to-line scatter 0.02

Band	red-optical
What was measured	Cr I · Codex-graded lines
Solar spectra	IAG FTS, Kitt Peak (1984, molecfit), Kitt Peak (Kurucz 2005)
Treatments	1D-LTE, 1D-NLTE, synth-mean3D-LTE-gerber-stagger, synth-mean3D-NLTE-gerber-stagger
Lines	7
Result A(Cr)	5.775–5.804 (synth-mean3D-NLTE-gerber-stagger)
Largest uncertainty terms (dex)	line strengths (gf) 0.06, fit / line-to-line scatter 0.06

Band	red-optical
What was measured	Cr I · reference lines
Solar spectra	IAG FTS, Kitt Peak (1984, molecfit), Kitt Peak (Kurucz 2005)
Treatments	1D-LTE, 1D-NLTE, synth-mean3D-LTE-gerber-stagger, synth-mean3D-NLTE-gerber-stagger
Lines	4
Result A(Cr)	5.758–5.792 (synth-mean3D-NLTE-gerber-stagger)
Largest uncertainty terms (dex)	fit / line-to-line scatter 0.11, line strengths (gf) 0.11

Band	NIR
What was measured	Cr I · Codex-graded lines
Solar spectra	IAG FTS, Kitt Peak (1984, molecfit), Kitt Peak (Kurucz 2005)
Treatments	1D-LTE, 1D-NLTE, synth-mean3D-LTE-gerber-stagger, synth-mean3D-NLTE-gerber-stagger
Lines	6–8
Result A(Cr)	6.180–6.263 (synth-mean3D-LTE-gerber-stagger)
Largest uncertainty terms (dex)	fit / line-to-line scatter 0.07, model atmosphere 0.03

Band	NIR
What was measured	Cr I · reference lines
Solar spectra	IAG FTS, Kitt Peak (1984, molecfit), Kitt Peak (Kurucz 2005)
Treatments	1D-LTE, 1D-NLTE, synth-mean3D-LTE-gerber-stagger, synth-mean3D-NLTE-gerber-stagger
Lines	6–8
Result A(Cr)	6.180–6.263 (synth-mean3D-LTE-gerber-stagger)
Largest uncertainty terms (dex)	fit / line-to-line scatter 0.07, model atmosphere 0.03

Band	NIR
What was measured	SET-CR_ELGUETA2026
Solar spectra	CRIRES+ J, CRIRES+ Y, CRIRES+ Y (full arm), IAG FTS, Kitt Peak (1984, molecfit), Kitt Peak (Kurucz 2005)
Treatments	1D-LTE, 1D-NLTE, synth-mean3D-LTE-gerber-stagger, synth-mean3D-NLTE-gerber-stagger
Lines	1–7
Result A(Cr)	5.615–5.791 (synth-mean3D-NLTE-gerber-stagger)
Largest uncertainty terms (dex)	fit / line-to-line scatter 0.05, model atmosphere 0.03

Solar chromium context

Chromium is measured from neutral Cr I and ionized Cr II lines from the near-ultraviolet to the near-infrared. The reference lines are the Cr I and Cr II lines Asplund et al. 2021 used, with the oscillator strengths they adopted; a wider set of lines with laboratory oscillator strengths and the Codex's own line selection are shown as separate products. The visible lines agree with Asplund. The near-infrared Cr I lines all come from one multiplet that the literature does not use, and they read about 0.5 dex high on every spectrum. The most likely cause is the laboratory oscillator strengths for this multiplet. Lines from the same upper levels and from the same lower level read normally in the blue and visible, and iron lines in the same infrared window read normally, so the spectrum and the model atmosphere are not to blame. The offset is the same for weak and strong lines, so it is not a blend or line broadening. Sobeck et al. 2007 calibrated their infrared values with a separate check on exactly these lines and did not use them on the Sun. We show the products as measured until better laboratory values exist. The near-ultraviolet result depends on which version of the Kitt Peak atlas is used. Chromium is also the first element with Theoretical Codex products. Past 973 nm no chromium line has a laboratory oscillator strength, so we measured the seven Cr I lines that Elgueta et al. 2026 found reliable in the Sun's Y and J bands, using oscillator strengths Kurucz calculated from atomic theory. They are shown as their own grade, never mixed with the laboratory grades and never used for the headline. Their uncertainty does not include the oscillator strengths, which have no published error, and we saw how they compare with the Sun before adopting them, so this is not a blind test.

Published line sets · gf uncertainty model · Methodology

Download the evidence

Download PDF — Solar Cr appendix

Source feed — includes quarantined fit outputs, not adopted abundances

Complete product visibility audit

Shared website/PDF report

Reproducibility manifest

Complete references and product-to-source bindings

Reproducibility

Generated from the pinned science snapshot. Source commit 24b2c041c24efaaeb59387de0a08cc9416a81ac8
Feed Cr.json v1.232 · updated 2026-11-16T05:10:15Z
Generated 2026-11-15T22:14:07-07:00 (source commit timestamp)
Feed SHA-256 4017a2eed6cfc00e8581702c34b0b22d026ff01e11cfbdc8c0a940f930e3dc71
Generator scripts/generate_cno_publication.py v1.0.0

Pinned scientific source

References / Data & Model Sources

Sources are separated by their role. Registered grid lineage and quarantined diagnostics do not imply an adopted abundance or an applied correction.

See the source notes for the distinction between reference lineage and the treatment actually recorded in each feed entry.

Science and provenance source notes

Solar abundance and indicator analyses. Solar Cr comparison literature; not an adopted Codex abundance. Sources: [1], [2].

Solar abundance and indicator analyses. Published line set CR_AGSS21 (the line selection). Sources: [3].

Atomic data and gf authorities. Cr II oscillator strengths of this pool, as the product's own uncertainty budget records them (with their lineage). Sources: [4], [5].

Model and grid sources. Feed treatment: 1D-LTE synthesis (Turbospectrum); no NLTE/3D correction claimed. Sources: [6].

Model and grid sources. Feed treatment: ENGINE-B-NLTE; Turbospectrum on the registered Gerber deck. The product retains its own atmosphere and ion identity. Sources: [6].

Model and grid sources. Feed treatment: synth-1D-LTE-gerber; Turbospectrum on the registered Gerber deck. The product retains its own atmosphere and ion identity. Sources: [6].

Model and grid sources. Feed treatment: synth-mean3D-LTE-gerber-stagger; Turbospectrum on the registered Gerber deck with the horizontally averaged 3D (<3D>) Stagger solar model; not a full 3D calculation. Sources: [6], [7].

Model and grid sources. Feed treatment: synth-mean3D-NLTE-gerber-stagger; Turbospectrum on the registered Gerber deck with the horizontally averaged 3D (<3D>) Stagger solar model; not a full 3D calculation. Sources: [6], [7].

Solar abundance and indicator analyses. Published line set CR_ELGUETA2026 (the line selection). Sources: [11].

Atomic data and gf authorities. Cr I oscillator strengths of this pool, as the product's own uncertainty budget records them (with their lineage). Sources: [12], [13].

Model and grid sources. Feed treatment: 1D NLTE, per-line correction from the Amarsi 2020 GALAH departure grid via PySME (data/nlte_grids/Cr_Bergemann2010_MPIA.csv). Sources: [17].

Product-to-source index

VIS · HARPS · SET-CR_AGSS21 · 1D LTE · [1], [2], [3], [4], [5], [6] Cr-products-424616468673

VIS · HARPS · SET-CR_AGSS21 · 1D NLTE (Gerber) · [1], [2], [3], [4], [5], [6] Cr-products-a494297e5f7b

VIS · HARPS · SET-CR_AGSS21 · 1D LTE (Gerber) · [1], [2], [3], [4], [5], [6] Cr-products-891de9d378a0

VIS · HARPS · SET-CR_AGSS21 · <3D> LTE (Gerber) · [1], [2], [3], [4], [5], [6], [7] Cr-products-6f27bf93970f

VIS · HARPS · SET-CR_AGSS21 · <3D> NLTE (Gerber) · [1], [2], [3], [4], [5], [6], [7] Cr-products-eafb93a6f1cc

VIS · HARPS · Cr II · Codex-graded lines · 1D LTE · [1], [2], [4], [8], [6] Cr-products-9b77bd5a6ed9

VIS · HARPS · Cr II · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [4], [8], [6] Cr-products-20cc1d3c90f3

VIS · HARPS · Cr II · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [4], [8], [6] Cr-products-6662c78b8f9a

VIS · HARPS · Cr II · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [4], [8], [6], [7] Cr-products-ffad0c043636

VIS · HARPS · Cr II · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [4], [8], [6], [7] Cr-products-0194a4f1c944

VIS · HARPS · Cr II · reference lines · 1D LTE · [1], [2], [4], [8], [6] Cr-products-fcfe17575b3f

VIS · HARPS · Cr II · reference lines · 1D NLTE (Gerber) · [1], [2], [4], [8], [6] Cr-products-9586ceb896fb

VIS · HARPS · Cr II · reference lines · 1D LTE (Gerber) · [1], [2], [4], [8], [6] Cr-products-dcfdb45c1c1d

VIS · HARPS · Cr II · reference lines · <3D> LTE (Gerber) · [1], [2], [4], [8], [6], [7] Cr-products-1c86db044ac9

VIS · HARPS · Cr II · reference lines · <3D> NLTE (Gerber) · [1], [2], [4], [8], [6], [7] Cr-products-a01a13a22464

VIS · Kitt Peak (Kurucz 2005) · SET-CR_AGSS21 · 1D LTE · [1], [2], [3], [4], [5], [6] Cr-products-d1c004c4dc67

VIS · Kitt Peak (Kurucz 2005) · SET-CR_AGSS21 · 1D NLTE (Gerber) · [1], [2], [3], [4], [5], [6] Cr-products-4cdfd057db02

VIS · Kitt Peak (Kurucz 2005) · SET-CR_AGSS21 · 1D LTE (Gerber) · [1], [2], [3], [4], [5], [6] Cr-products-5aeaf19c87a2

VIS · Kitt Peak (Kurucz 2005) · SET-CR_AGSS21 · <3D> LTE (Gerber) · [1], [2], [3], [4], [5], [6], [7] Cr-products-9341c4dbcb54

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VIS · Kitt Peak (Kurucz 2005) · Cr II · Codex-graded lines · 1D LTE · [1], [2], [4], [8], [6] Cr-products-39dac8dc9ec3

VIS · Kitt Peak (Kurucz 2005) · Cr II · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [4], [8], [6] Cr-products-c744b21f0e9c

VIS · Kitt Peak (Kurucz 2005) · Cr II · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [4], [8], [6] Cr-products-b5ebbfa82202

VIS · Kitt Peak (Kurucz 2005) · Cr II · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [4], [8], [6], [7] Cr-products-b86f791a9aca

VIS · Kitt Peak (Kurucz 2005) · Cr II · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [4], [8], [6], [7] Cr-products-f4ee85167318

VIS · Kitt Peak (Kurucz 2005) · Cr II · reference lines · 1D LTE · [1], [2], [4], [8], [6] Cr-products-7987546b74fa

VIS · Kitt Peak (Kurucz 2005) · Cr II · reference lines · 1D NLTE (Gerber) · [1], [2], [4], [8], [6] Cr-products-44a87b7fc61b

VIS · Kitt Peak (Kurucz 2005) · Cr II · reference lines · 1D LTE (Gerber) · [1], [2], [4], [8], [6] Cr-products-58c03a226a46

VIS · Kitt Peak (Kurucz 2005) · Cr II · reference lines · <3D> LTE (Gerber) · [1], [2], [4], [8], [6], [7] Cr-products-b96fda2ee2d0

VIS · Kitt Peak (Kurucz 2005) · Cr II · reference lines · <3D> NLTE (Gerber) · [1], [2], [4], [8], [6], [7] Cr-products-c08fe8f82053

VIS · Kitt Peak (1984, molecfit) · SET-CR_AGSS21 · 1D LTE · [1], [2], [3], [4], [5], [6] Cr-products-400d74908c2e

VIS · Kitt Peak (1984, molecfit) · SET-CR_AGSS21 · 1D NLTE (Gerber) · [1], [2], [3], [4], [5], [6] Cr-products-adedc350e7d7

VIS · Kitt Peak (1984, molecfit) · SET-CR_AGSS21 · 1D LTE (Gerber) · [1], [2], [3], [4], [5], [6] Cr-products-303da74f07f9

VIS · Kitt Peak (1984, molecfit) · SET-CR_AGSS21 · <3D> LTE (Gerber) · [1], [2], [3], [4], [5], [6], [7] Cr-products-a4395d7dea91

VIS · Kitt Peak (1984, molecfit) · SET-CR_AGSS21 · <3D> NLTE (Gerber) · [1], [2], [3], [4], [5], [6], [7] Cr-products-035cfa50c357

VIS · Kitt Peak (1984, molecfit) · Cr II · Codex-graded lines · 1D LTE · [1], [2], [4], [8], [6] Cr-products-199d013d7db2

VIS · Kitt Peak (1984, molecfit) · Cr II · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [4], [8], [6] Cr-products-05154386ef1d

VIS · Kitt Peak (1984, molecfit) · Cr II · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [4], [8], [6] Cr-products-25682df820b4

VIS · Kitt Peak (1984, molecfit) · Cr II · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [4], [8], [6], [7] Cr-products-160ba1d8e2b5

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VIS · Kitt Peak (1984, molecfit) · Cr II · reference lines · 1D NLTE (Gerber) · [1], [2], [4], [8], [6] Cr-products-a0397fbb3013

VIS · Kitt Peak (1984, molecfit) · Cr II · reference lines · 1D LTE (Gerber) · [1], [2], [4], [8], [6] Cr-products-ec2f3f2fbb06

VIS · Kitt Peak (1984, molecfit) · Cr II · reference lines · <3D> LTE (Gerber) · [1], [2], [4], [8], [6], [7] Cr-products-bec916998bbd

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near-UV · Kitt Peak (Kurucz 2005) · Cr II · Codex-graded lines · 1D LTE · [1], [2], [8], [9], [6] Cr-products-45cdc23dd5ea

near-UV · Kitt Peak (Kurucz 2005) · Cr II · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [8], [9], [4], [6] Cr-products-3fb9231227a3

near-UV · Kitt Peak (Kurucz 2005) · Cr II · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [8], [9], [6] Cr-products-0a2e366dd60c

near-UV · Kitt Peak (Kurucz 2005) · Cr II · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [8], [9], [4], [6], [7] Cr-products-79d97d59e1eb

near-UV · Kitt Peak (Kurucz 2005) · Cr II · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [8], [9], [4], [6], [7] Cr-products-588a9d58b2ac

near-UV · Kitt Peak (Kurucz 2005) · Cr II · reference lines · 1D LTE · [1], [2], [9], [4], [8], [10], [6] Cr-products-f71d3d940ab9

near-UV · Kitt Peak (Kurucz 2005) · Cr II · reference lines · 1D NLTE (Gerber) · [1], [2], [9], [4], [8], [10], [6] Cr-products-53142bf44c16

near-UV · Kitt Peak (Kurucz 2005) · Cr II · reference lines · 1D LTE (Gerber) · [1], [2], [9], [4], [8], [10], [6] Cr-products-d5d865337bf3

near-UV · Kitt Peak (Kurucz 2005) · Cr II · reference lines · <3D> LTE (Gerber) · [1], [2], [9], [4], [8], [10], [6], [7] Cr-products-1cccba500e69

near-UV · Kitt Peak (Kurucz 2005) · Cr II · reference lines · <3D> NLTE (Gerber) · [1], [2], [9], [4], [8], [10], [6], [7] Cr-products-bf75831e89d5

near-UV · Kitt Peak (1984, molecfit) · Cr II · Codex-graded lines · 1D LTE · [1], [2], [8], [9], [6] Cr-products-0eb6343e01ac

near-UV · Kitt Peak (1984, molecfit) · Cr II · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [8], [9], [6] Cr-products-d4ecaf2de748

near-UV · Kitt Peak (1984, molecfit) · Cr II · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [8], [9], [6] Cr-products-986100e61722

near-UV · Kitt Peak (1984, molecfit) · Cr II · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [8], [9], [4], [6], [7] Cr-products-089bed32ebf2

near-UV · Kitt Peak (1984, molecfit) · Cr II · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [8], [9], [4], [6], [7] Cr-products-6bbae51378d9

near-UV · Kitt Peak (1984, molecfit) · Cr II · reference lines · 1D LTE · [1], [2], [9], [4], [8], [10], [6] Cr-products-5010b146f5b0

near-UV · Kitt Peak (1984, molecfit) · Cr II · reference lines · 1D NLTE (Gerber) · [1], [2], [9], [4], [8], [10], [6] Cr-products-af771f9e6563

near-UV · Kitt Peak (1984, molecfit) · Cr II · reference lines · 1D LTE (Gerber) · [1], [2], [9], [4], [8], [10], [6] Cr-products-345a825d2138

near-UV · Kitt Peak (1984, molecfit) · Cr II · reference lines · <3D> LTE (Gerber) · [1], [2], [9], [4], [8], [10], [6], [7] Cr-products-72ea654f3e53

near-UV · Kitt Peak (1984, molecfit) · Cr II · reference lines · <3D> NLTE (Gerber) · [1], [2], [9], [4], [8], [10], [6], [7] Cr-products-9f29d8f3d01c

NIR · CRIRES+ J · SET-CR_ELGUETA2026 · 1D LTE · [1], [2], [11], [12], [13], [6] Cr-products-d3ad14e461cc

NIR · CRIRES+ J · SET-CR_ELGUETA2026 · 1D NLTE (Gerber) · [1], [2], [11], [12], [13], [6] Cr-products-8c0cc991261d

NIR · CRIRES+ J · SET-CR_ELGUETA2026 · 1D LTE (Gerber) · [1], [2], [11], [12], [13], [6] Cr-products-a5e62db56561

NIR · CRIRES+ J · SET-CR_ELGUETA2026 · <3D> LTE (Gerber) · [1], [2], [11], [12], [13], [6], [7] Cr-products-305426a2300d

NIR · CRIRES+ J · SET-CR_ELGUETA2026 · <3D> NLTE (Gerber) · [1], [2], [11], [12], [13], [6], [7] Cr-products-fec71e34bd21

NIR · CRIRES+ Y · SET-CR_ELGUETA2026 · 1D LTE · [1], [2], [11], [12], [13], [6] Cr-products-977aa4f1a6d2

NIR · CRIRES+ Y · SET-CR_ELGUETA2026 · 1D NLTE (Gerber) · [1], [2], [11], [12], [13], [6] Cr-products-e4d5ac6122a0

NIR · CRIRES+ Y · SET-CR_ELGUETA2026 · 1D LTE (Gerber) · [1], [2], [11], [12], [13], [6] Cr-products-46c83159463d

NIR · CRIRES+ Y · SET-CR_ELGUETA2026 · <3D> LTE (Gerber) · [1], [2], [11], [12], [13], [6], [7] Cr-products-d4104362ba80

NIR · CRIRES+ Y · SET-CR_ELGUETA2026 · <3D> NLTE (Gerber) · [1], [2], [11], [12], [13], [6], [7] Cr-products-5b2dcc9891b4

NIR · CRIRES+ Y (full arm) · SET-CR_ELGUETA2026 · 1D LTE · [1], [2], [11], [12], [13], [6] Cr-products-2b3a764b042f

NIR · CRIRES+ Y (full arm) · SET-CR_ELGUETA2026 · 1D NLTE (Gerber) · [1], [2], [11], [12], [13], [6] Cr-products-60ef490ac9eb

NIR · CRIRES+ Y (full arm) · SET-CR_ELGUETA2026 · 1D LTE (Gerber) · [1], [2], [11], [12], [13], [6] Cr-products-a57b4a085484

NIR · CRIRES+ Y (full arm) · SET-CR_ELGUETA2026 · <3D> LTE (Gerber) · [1], [2], [11], [12], [13], [6], [7] Cr-products-5ef0df6216a9

NIR · CRIRES+ Y (full arm) · SET-CR_ELGUETA2026 · <3D> NLTE (Gerber) · [1], [2], [11], [12], [13], [6], [7] Cr-products-62e6a0e51830

NIR · IAG FTS · SET-CR_ELGUETA2026 · 1D LTE · [1], [2], [11], [12], [13], [6] Cr-products-0b66fa63d885

NIR · IAG FTS · SET-CR_ELGUETA2026 · 1D NLTE (Gerber) · [1], [2], [11], [12], [13], [6] Cr-products-8399e83fe4fe

NIR · IAG FTS · SET-CR_ELGUETA2026 · 1D LTE (Gerber) · [1], [2], [11], [12], [13], [6] Cr-products-8efc90df227f

NIR · IAG FTS · SET-CR_ELGUETA2026 · <3D> LTE (Gerber) · [1], [2], [11], [12], [13], [6], [7] Cr-products-002e7c86a5a6

NIR · IAG FTS · SET-CR_ELGUETA2026 · <3D> NLTE (Gerber) · [1], [2], [11], [12], [13], [6], [7] Cr-products-cb4f4d1f9117

NIR · IAG FTS · Cr I · Codex-graded lines · 1D LTE · [1], [2], [14], [6] Cr-products-22b0c7ab2e29

NIR · IAG FTS · Cr I · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [14], [6] Cr-products-a161357841f5

NIR · IAG FTS · Cr I · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [14], [6] Cr-products-ee266a93b750

NIR · IAG FTS · Cr I · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-457b7c3fac61

NIR · IAG FTS · Cr I · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-b9420f3faa2b

NIR · IAG FTS · Cr I · reference lines · 1D LTE · [1], [2], [14], [6] Cr-products-ec13177ce769

NIR · IAG FTS · Cr I · reference lines · 1D NLTE (Gerber) · [1], [2], [14], [6] Cr-products-0159d0c945dd

NIR · IAG FTS · Cr I · reference lines · 1D LTE (Gerber) · [1], [2], [14], [6] Cr-products-1ad5a4fca839

NIR · IAG FTS · Cr I · reference lines · <3D> LTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-13b89f89aed4

NIR · IAG FTS · Cr I · reference lines · <3D> NLTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-7d562127f676

NIR · Kitt Peak (Kurucz 2005) · SET-CR_ELGUETA2026 · 1D LTE · [1], [2], [11], [12], [13], [6] Cr-products-0b114ebe91a5

NIR · Kitt Peak (Kurucz 2005) · SET-CR_ELGUETA2026 · 1D NLTE (Gerber) · [1], [2], [11], [12], [13], [6] Cr-products-6d9d1af8783f

NIR · Kitt Peak (Kurucz 2005) · SET-CR_ELGUETA2026 · 1D LTE (Gerber) · [1], [2], [11], [12], [13], [6] Cr-products-7c2009bc7e73

NIR · Kitt Peak (Kurucz 2005) · SET-CR_ELGUETA2026 · <3D> LTE (Gerber) · [1], [2], [11], [12], [13], [6], [7] Cr-products-5bbb41f2bbca

NIR · Kitt Peak (Kurucz 2005) · SET-CR_ELGUETA2026 · <3D> NLTE (Gerber) · [1], [2], [11], [12], [13], [6], [7] Cr-products-10fb4ca0d942

NIR · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · 1D LTE · [1], [2], [14], [6] Cr-products-2ed3111324c9

NIR · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [14], [6] Cr-products-efdba1793723

NIR · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [14], [6] Cr-products-be8ec063a5aa

NIR · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-01a7b0cf27aa

NIR · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-7f832755261e

NIR · Kitt Peak (Kurucz 2005) · Cr I · reference lines · 1D LTE · [1], [2], [14], [6] Cr-products-923e1cc3e514

NIR · Kitt Peak (Kurucz 2005) · Cr I · reference lines · 1D NLTE (Gerber) · [1], [2], [14], [6] Cr-products-e9e26823d683

NIR · Kitt Peak (Kurucz 2005) · Cr I · reference lines · 1D LTE (Gerber) · [1], [2], [14], [6] Cr-products-98e3670d414c

NIR · Kitt Peak (Kurucz 2005) · Cr I · reference lines · <3D> LTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-ccafae11a6df

NIR · Kitt Peak (Kurucz 2005) · Cr I · reference lines · <3D> NLTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-7f8ad29749a5

NIR · Kitt Peak (1984, molecfit) · SET-CR_ELGUETA2026 · 1D LTE · [1], [2], [11], [12], [13], [6] Cr-products-8c914bd72829

NIR · Kitt Peak (1984, molecfit) · SET-CR_ELGUETA2026 · 1D NLTE (Gerber) · [1], [2], [11], [12], [13], [6] Cr-products-5096e2c7ff43

NIR · Kitt Peak (1984, molecfit) · SET-CR_ELGUETA2026 · 1D LTE (Gerber) · [1], [2], [11], [12], [13], [6] Cr-products-75f328b11330

NIR · Kitt Peak (1984, molecfit) · SET-CR_ELGUETA2026 · <3D> LTE (Gerber) · [1], [2], [11], [12], [13], [6], [7] Cr-products-a71a4ba71a7f

NIR · Kitt Peak (1984, molecfit) · SET-CR_ELGUETA2026 · <3D> NLTE (Gerber) · [1], [2], [11], [12], [13], [6], [7] Cr-products-8421e8a4956c

NIR · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · 1D LTE · [1], [2], [14], [6] Cr-products-fb05c3e2eb94

NIR · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [14], [6] Cr-products-3260466c5b1f

NIR · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [14], [6] Cr-products-751d672e7429

NIR · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-4f1818a1bc79

NIR · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-6e44f99a18c6

NIR · Kitt Peak (1984, molecfit) · Cr I · reference lines · 1D LTE · [1], [2], [14], [6] Cr-products-e74b4659ead2

NIR · Kitt Peak (1984, molecfit) · Cr I · reference lines · 1D NLTE (Gerber) · [1], [2], [14], [6] Cr-products-9e9e1d2a77f5

NIR · Kitt Peak (1984, molecfit) · Cr I · reference lines · 1D LTE (Gerber) · [1], [2], [14], [6] Cr-products-9ead83cc1509

NIR · Kitt Peak (1984, molecfit) · Cr I · reference lines · <3D> LTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-38f8a10afdbf

NIR · Kitt Peak (1984, molecfit) · Cr I · reference lines · <3D> NLTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-f0af64c79965

VIS · HARPS · SET-CR_AGSS21 · 1D LTE · [1], [2], [3], [14], [15], [16], [6] Cr-products-70c21708c48f

VIS · HARPS · SET-CR_AGSS21 · 1D NLTE (Bergemann) · [1], [2], [3], [14], [16], [17] Cr-products-c46d6c438630

VIS · HARPS · SET-CR_AGSS21 · 1D NLTE (Gerber) · [1], [2], [3], [14], [15], [16], [6] Cr-products-280ac34ab404

VIS · HARPS · SET-CR_AGSS21 · 1D LTE (Gerber) · [1], [2], [3], [14], [15], [16], [6] Cr-products-6e42ef9fdabe

VIS · HARPS · SET-CR_AGSS21 · <3D> LTE (Gerber) · [1], [2], [3], [14], [15], [16], [6], [7] Cr-products-483f9cc6faae

VIS · HARPS · SET-CR_AGSS21 · <3D> NLTE (Gerber) · [1], [2], [3], [14], [15], [16], [6], [7] Cr-products-5310147cf4d8

VIS · HARPS · Cr I · Codex-graded lines · 1D LTE · [1], [2], [14], [15], [3], [18], [6] Cr-products-689265fe1ce3

VIS · HARPS · Cr I · Codex-graded lines · 1D NLTE (Bergemann) · [1], [2], [14], [3], [15], [17] Cr-products-8be24b38a2ce

VIS · HARPS · Cr I · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [14], [15], [3], [6] Cr-products-3bceba18ac93

VIS · HARPS · Cr I · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [14], [15], [3], [18], [6] Cr-products-4e2934592635

VIS · HARPS · Cr I · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [14], [15], [3], [18], [6], [7] Cr-products-626794cba003

VIS · HARPS · Cr I · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [14], [15], [3], [6], [7] Cr-products-8140945f2bd6

VIS · HARPS · Cr I · reference lines · 1D LTE · [1], [2], [14], [18], [6] Cr-products-6c7e139ec9a1

VIS · HARPS · Cr I · reference lines · 1D NLTE (Bergemann) · [1], [2], [14], [17] Cr-products-83b39b553de8

VIS · HARPS · Cr I · reference lines · 1D NLTE (Gerber) · [1], [2], [14], [6] Cr-products-8e572b275ba4

VIS · HARPS · Cr I · reference lines · 1D LTE (Gerber) · [1], [2], [14], [18], [6] Cr-products-584b08f1462c

VIS · HARPS · Cr I · reference lines · <3D> LTE (Gerber) · [1], [2], [14], [18], [6], [7] Cr-products-3709bc30838e

VIS · HARPS · Cr I · reference lines · <3D> NLTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-e69f15df5991

VIS · Kitt Peak (Kurucz 2005) · SET-CR_AGSS21 · 1D LTE · [1], [2], [3], [14], [15], [16], [6] Cr-products-4dd150b5ad17

VIS · Kitt Peak (Kurucz 2005) · SET-CR_AGSS21 · 1D NLTE (Bergemann) · [1], [2], [3], [14], [16], [17] Cr-products-03a41dacd9e6

VIS · Kitt Peak (Kurucz 2005) · SET-CR_AGSS21 · 1D NLTE (Gerber) · [1], [2], [3], [14], [15], [16], [6] Cr-products-c187a252bc67

VIS · Kitt Peak (Kurucz 2005) · SET-CR_AGSS21 · 1D LTE (Gerber) · [1], [2], [3], [14], [15], [16], [6] Cr-products-072326b9d032

VIS · Kitt Peak (Kurucz 2005) · SET-CR_AGSS21 · <3D> LTE (Gerber) · [1], [2], [3], [14], [15], [16], [6], [7] Cr-products-a6a207911158

VIS · Kitt Peak (Kurucz 2005) · SET-CR_AGSS21 · <3D> NLTE (Gerber) · [1], [2], [3], [14], [15], [16], [6], [7] Cr-products-bf65deaf82f8

VIS · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · 1D LTE · [1], [2], [14], [15], [3], [18], [6] Cr-products-51f3d76537c6

VIS · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · 1D NLTE (Bergemann) · [1], [2], [14], [3], [15], [17] Cr-products-2e401a952c2a

VIS · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [14], [15], [3], [6] Cr-products-aeb99756096a

VIS · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [14], [15], [3], [18], [6] Cr-products-484185b76097

VIS · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [14], [15], [3], [18], [6], [7] Cr-products-e7d03d53c1bc

VIS · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [14], [15], [3], [6], [7] Cr-products-3676ec40b3fe

VIS · Kitt Peak (Kurucz 2005) · Cr I · reference lines · 1D LTE · [1], [2], [14], [18], [6] Cr-products-4d4080edd762

VIS · Kitt Peak (Kurucz 2005) · Cr I · reference lines · 1D NLTE (Bergemann) · [1], [2], [14], [17] Cr-products-32ef50df83f0

VIS · Kitt Peak (Kurucz 2005) · Cr I · reference lines · 1D NLTE (Gerber) · [1], [2], [14], [6] Cr-products-64de22c19816

VIS · Kitt Peak (Kurucz 2005) · Cr I · reference lines · 1D LTE (Gerber) · [1], [2], [14], [18], [6] Cr-products-d256c4e33348

VIS · Kitt Peak (Kurucz 2005) · Cr I · reference lines · <3D> LTE (Gerber) · [1], [2], [14], [18], [6], [7] Cr-products-4389d9c78946

VIS · Kitt Peak (Kurucz 2005) · Cr I · reference lines · <3D> NLTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-bf3552a97c5a

VIS · Kitt Peak (1984, molecfit) · SET-CR_AGSS21 · 1D LTE · [1], [2], [3], [14], [15], [16], [6] Cr-products-54c08e2d5234

VIS · Kitt Peak (1984, molecfit) · SET-CR_AGSS21 · 1D NLTE (Bergemann) · [1], [2], [3], [14], [16], [17] Cr-products-0a38efd36557

VIS · Kitt Peak (1984, molecfit) · SET-CR_AGSS21 · 1D NLTE (Gerber) · [1], [2], [3], [14], [15], [16], [6] Cr-products-2adb9864b59f

VIS · Kitt Peak (1984, molecfit) · SET-CR_AGSS21 · 1D LTE (Gerber) · [1], [2], [3], [14], [15], [16], [6] Cr-products-9ce33538eb91

VIS · Kitt Peak (1984, molecfit) · SET-CR_AGSS21 · <3D> LTE (Gerber) · [1], [2], [3], [14], [15], [16], [6], [7] Cr-products-a0c8f0296d19

VIS · Kitt Peak (1984, molecfit) · SET-CR_AGSS21 · <3D> NLTE (Gerber) · [1], [2], [3], [14], [15], [16], [6], [7] Cr-products-4bb6653c8887

VIS · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · 1D LTE · [1], [2], [14], [15], [3], [18], [6] Cr-products-59874338154d

VIS · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · 1D NLTE (Bergemann) · [1], [2], [14], [3], [15], [17] Cr-products-9f7f03c9e994

VIS · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [14], [15], [3], [6] Cr-products-afb190e401cb

VIS · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [14], [15], [3], [18], [6] Cr-products-25f2cf000ec2

VIS · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [14], [15], [3], [18], [6], [7] Cr-products-cd2a372480e2

VIS · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [14], [15], [3], [6], [7] Cr-products-a083f2715b52

VIS · Kitt Peak (1984, molecfit) · Cr I · reference lines · 1D LTE · [1], [2], [14], [18], [6] Cr-products-1e25fe0106e6

VIS · Kitt Peak (1984, molecfit) · Cr I · reference lines · 1D NLTE (Bergemann) · [1], [2], [14], [17] Cr-products-54c8110fc578

VIS · Kitt Peak (1984, molecfit) · Cr I · reference lines · 1D NLTE (Gerber) · [1], [2], [14], [6] Cr-products-ae0bcdc4b96d

VIS · Kitt Peak (1984, molecfit) · Cr I · reference lines · 1D LTE (Gerber) · [1], [2], [14], [18], [6] Cr-products-47600f0db356

VIS · Kitt Peak (1984, molecfit) · Cr I · reference lines · <3D> LTE (Gerber) · [1], [2], [14], [18], [6], [7] Cr-products-bb199f110491

VIS · Kitt Peak (1984, molecfit) · Cr I · reference lines · <3D> NLTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-8cf998cd5553

near-UV · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · 1D LTE · [1], [2], [14], [6] Cr-products-f0e675de484c

near-UV · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [14], [6] Cr-products-6c38e04d9c25

near-UV · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [14], [6] Cr-products-b48b55461296

near-UV · Kitt Peak (Kurucz 2005) · Cr I · reference lines · 1D LTE · [1], [2], [14], [6] Cr-products-c84bd3928d12

near-UV · Kitt Peak (Kurucz 2005) · Cr I · reference lines · 1D NLTE (Gerber) · [1], [2], [14], [6] Cr-products-8917c8867995

near-UV · Kitt Peak (Kurucz 2005) · Cr I · reference lines · 1D LTE (Gerber) · [1], [2], [14], [6] Cr-products-46f0563b2810

near-UV · Kitt Peak (Kurucz 2005) · Cr I · reference lines · <3D> LTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-bb0ded94a88a

near-UV · Kitt Peak (Kurucz 2005) · Cr I · reference lines · <3D> NLTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-881029b7428d

near-UV · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · 1D LTE · [1], [2], [18], [14], [6] Cr-products-387c43a66f75

near-UV · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [14], [6] Cr-products-ada30470f988

near-UV · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [18], [14], [6] Cr-products-5c208a0b203f

near-UV · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [18], [14], [6], [7] Cr-products-eabc75ef41f8

near-UV · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-1248f850f458

near-UV · Kitt Peak (1984, molecfit) · Cr I · reference lines · 1D LTE · [1], [2], [14], [18], [6] Cr-products-ba4f08a8bff4

near-UV · Kitt Peak (1984, molecfit) · Cr I · reference lines · 1D NLTE (Gerber) · [1], [2], [14], [6] Cr-products-15c03fe61506

near-UV · Kitt Peak (1984, molecfit) · Cr I · reference lines · 1D LTE (Gerber) · [1], [2], [14], [18], [6] Cr-products-d76495dfe7ab

near-UV · Kitt Peak (1984, molecfit) · Cr I · reference lines · <3D> LTE (Gerber) · [1], [2], [14], [18], [6], [7] Cr-products-b204922aae3c

near-UV · Kitt Peak (1984, molecfit) · Cr I · reference lines · <3D> NLTE (Gerber) · [1], [2], [14], [6], [7] Cr-products-6e914746ca0e

red-optical · IAG FTS · Cr I · Codex-graded lines · 1D LTE · [1], [2], [15], [18], [14], [6] Cr-products-5e3ab8115cda

red-optical · IAG FTS · Cr I · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [15], [18], [14], [6] Cr-products-900315ee7888

red-optical · IAG FTS · Cr I · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [15], [18], [14], [6] Cr-products-b3ac921de5c5

red-optical · IAG FTS · Cr I · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [15], [18], [14], [6], [7] Cr-products-d331b544a391

red-optical · IAG FTS · Cr I · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [15], [18], [14], [6], [7] Cr-products-3279e43ceba9

red-optical · IAG FTS · Cr I · reference lines · 1D LTE · [1], [2], [18], [14], [6] Cr-products-fdefbc35743d

red-optical · IAG FTS · Cr I · reference lines · 1D NLTE (Gerber) · [1], [2], [18], [14], [6] Cr-products-211842e6ff5e

red-optical · IAG FTS · Cr I · reference lines · 1D LTE (Gerber) · [1], [2], [18], [14], [6] Cr-products-68252a731bae

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red-optical · IAG FTS · Cr I · reference lines · <3D> NLTE (Gerber) · [1], [2], [18], [14], [6], [7] Cr-products-5aff9aca0d8f

red-optical · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · 1D LTE · [1], [2], [15], [18], [14], [6] Cr-products-58cfa8573900

red-optical · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [15], [18], [14], [6] Cr-products-4be26aa69c6b

red-optical · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [15], [18], [14], [6] Cr-products-d0fa428cd048

red-optical · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [15], [18], [14], [6], [7] Cr-products-7b2bde6ed57a

red-optical · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [15], [18], [14], [6], [7] Cr-products-7a6cc3c6ccac

red-optical · Kitt Peak (Kurucz 2005) · Cr I · reference lines · 1D LTE · [1], [2], [18], [14], [6] Cr-products-79bddda067c0

red-optical · Kitt Peak (Kurucz 2005) · Cr I · reference lines · 1D NLTE (Gerber) · [1], [2], [18], [14], [6] Cr-products-c9db893e2ecf

red-optical · Kitt Peak (Kurucz 2005) · Cr I · reference lines · 1D LTE (Gerber) · [1], [2], [18], [14], [6] Cr-products-fb83f160d090

red-optical · Kitt Peak (Kurucz 2005) · Cr I · reference lines · <3D> LTE (Gerber) · [1], [2], [18], [14], [6], [7] Cr-products-db745af4f479

red-optical · Kitt Peak (Kurucz 2005) · Cr I · reference lines · <3D> NLTE (Gerber) · [1], [2], [18], [14], [6], [7] Cr-products-530f96da989f

red-optical · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · 1D LTE · [1], [2], [15], [18], [14], [6] Cr-products-625a85012f7c

red-optical · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · 1D NLTE (Gerber) · [1], [2], [15], [18], [14], [6] Cr-products-a70533f20706

red-optical · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · 1D LTE (Gerber) · [1], [2], [15], [18], [14], [6] Cr-products-a2a308621b2c

red-optical · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [15], [18], [14], [6], [7] Cr-products-c19d113a19e7

red-optical · Kitt Peak (1984, molecfit) · Cr I · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [15], [18], [14], [6], [7] Cr-products-ae0c183380f2

red-optical · Kitt Peak (1984, molecfit) · Cr I · reference lines · 1D LTE · [1], [2], [18], [14], [6] Cr-products-d8dde83a0b1a

red-optical · Kitt Peak (1984, molecfit) · Cr I · reference lines · 1D NLTE (Gerber) · [1], [2], [18], [14], [6] Cr-products-6d11651f7077

red-optical · Kitt Peak (1984, molecfit) · Cr I · reference lines · 1D LTE (Gerber) · [1], [2], [18], [14], [6] Cr-products-0c8a1460fa9a

red-optical · Kitt Peak (1984, molecfit) · Cr I · reference lines · <3D> LTE (Gerber) · [1], [2], [18], [14], [6], [7] Cr-products-a2ed4f809ce7

red-optical · Kitt Peak (1984, molecfit) · Cr I · reference lines · <3D> NLTE (Gerber) · [1], [2], [18], [14], [6], [7] Cr-products-77324e611916

near-UV · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · <3D> NLTE (Gerber) · [1], [2], [15], [14], [6], [7] Cr-quarantine-af030ee885a9

near-UV · Kitt Peak (Kurucz 2005) · Cr I · Codex-graded lines · <3D> LTE (Gerber) · [1], [2], [15], [14], [6], [7] Cr-quarantine-dc6fbc36ad2d

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