Why B [He] $2s^2\ 2p^1$ is '***unambiguous***' ground state configuration

Experimental spectrum (states) of B

ASD — Data: Lines, Levels — Information: List of Spectra, Ground States & Ionization Energies, Bibliography, Help

NIST Atomic Spectra Database Levels Data

Example of how to reference these results
Kramida, A., Ralchenko, Yu., Reader, J., and
Spectra Database (ver. 5.0), [Online]. Availab
October 17]. National Institute of Standards

B I 125 Levels Found

Z = 5, B isoelectronic sequence

Some data for neutral and singly-charged ions are available in the Handbook of Basic Atomic Spectroscopic Data

Configuration	Term	J	Level (cm^{-1})
$2s^2 2p$	$^2P°$	$^1/_2$	0.0000
		$^3/_2$	15.287
$2s2p^2$	^4P	$^1/_2$	28 647.43+x
		$^3/_2$	28 652.07+x
		$^5/_2$	28 658.40+x
$2s^2 3s$	^2S	$^1/_2$	40 039.6907
$2s2p^2$	^2D	$^5/_2$	47 856.809
		$^3/_2$	47 857.125
$2s^2 3p$	$^2P°$	$^1/$	48 611.8663

E

Only 'one' energy state
(ignore 3/2 vs 1/2)

Excited states have excited [He] $2s^1\ 2p^2$ configuration

↑ ↑ ↑ _

Why C [He] $2s^2\ 2p^2$ is '**ambiguous**' ground state configuration

Experimental spectrum (states) of C

ASD DATA — LINES LEVELS — INFORMATION — LIST OF SPECTRA, GROUND STATES & IONIZATION ENERGIES, BIBLIOGR.

NIST Atomic Spectra Database Levels Data

Example of how to referenc
Kramida, A., Ralchenko, Yu.,
Spectra Database (ver. 5.0), [
October 17]. National Institute

C I 282 Levels Found

Z = 6, C isoelectronic sequence

Some data for neutral and singly-charged ions are available in the Handbook of Basic Atomic Spectrosc

Configuration	Term	J	Level (cm^{-1})
$2s^2 2p^2$ ↑ ↑ _	^3P	0	0.00
		1	16.40
		2	43.40
$2s^2 2p^2$ ↑ ↓ _	^1D	2	10 192.63
$2s^2 2p^2$ ↑↓ _ _	^1S	0	21 648.01
$2s 2p^3$	$^5S°$	2	*33 735.20*
$2s^2 2p 3s$	$^3P°$	0	*60 333.43*
		1	*60 352.63*
		2	*60 393.14*

E ↓

Ground energy state
(ignore 0 vs 1 vs 2)

Excited states with same [He] $2s^2\ 2p^2$ configuration