

$^{178}\text{Hf}$        $Z = 72$        $N = 106$       [link to full NNDC output](#)

Based on ENSDF from Dec 2018, and mass evaluation from 2016

BE = 1432.801 ( 0.001) MeV

	Energy T	J+	J-	J-other	T1/2
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S-alpha=	-2.084	( 0.000)	-----		
178HF 1	0.000	0+			1 STABLE
178HF 2	0.093	2+			2 1.494 NS 23
178HF 3	0.307	4+			3
178HF 4	0.632	6+			4 11.2 PS 6
178HF 5	1.059	8+			5 2.77 PS 6
178HF 6			1.147	8-	6 4.0 S 2
178HF 7	1.175	2+			7 0.62 PS 2
178HF 8	1.199	0+			8
178HF 9			1.260	2-	9
178HF 10	1.269	3+			10
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178HF 11	1.277	2+			11 0.49 PS +15-10
178HF 12			1.310	1-	12
178HF 13			1.322	3-	13
178HF 14			1.363	2-	14
178HF 15			1.364	9-	15
178HF 16	1.384	4+			16
178HF 17			1.409	4-	17
178HF 18				1.434 (3)-	18
178HF 19	1.434	0+			19
178HF 20	1.444	0+			20
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178HF 21	1.450	4+			21 1.0 PS 9
178HF 22			1.479	8-	22
178HF 23	1.496	2+			23 0.9 PS 2
178HF 24				1.513 (5)-	24
178HF 25	1.514	2+			25
178HF 26				1.514	26
178HF 27	1.514	4+			27 62 PS
178HF 28	1.533	5+			28
178HF 29			1.539	4-	29
178HF 30	1.554	6+			30 77.5 NS 7
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178HF 31	1.562	2+			31
178HF 32			1.567	2-	32
178HF 33	1.570	10+			33 1.03 PS 3
178HF 34			1.601	10-	34
178HF 35	1.636	4+			35
178HF 36			1.637	5-	36 0.4 NS 1
178HF 37			1.640	3-	37

178HF	38	1.640	5+					38
178HF	39					1.649	(6)-	39
178HF	40					1.651	(5)-	40
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178HF	41					1.654	(4+)	41
178HF	42	1.691	6+					42
178HF	43					1.697	(9-)	43
178HF	44					1.731	(6)+	44
178HF	45					1.742	(7+)	45
178HF	46			1.747	4-			46
178HF	47	1.758	3+					47
178HF	48	1.772	0+					48
178HF	49					1.781	(6)-	49
178HF	50	1.789	6+					50
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178HF	51			1.803	3-			51
178HF	52					1.808	(2)+	52
178HF	53	1.818	2+					53 0.50 PS 23
178HF	54					1.857	(2)-	54
178HF	55					1.859	(11)-	55
178HF	56	1.862	3+					56
178HF	57					1.864	(5)-	57
178HF	58	1.870	4+					58
178HF	59	1.890	7+					59
178HF	60	1.891	2+					60
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178HF	61			1.914	4-			61
178HF	62			1.917	3-			62
178HF	63					1.939	(10-)	63
178HF	64					1.942	1+,2+,3+	64
178HF	65					1.948	(7)-	65
178HF	66					1.952	(8+)	66
178HF	67	1.953	4+					67
178HF	68	1.954	7+					68
178HF	69	1.956	4+					69
178HF	70					1.986	1+,2+,3+	70
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178HF	71	1.997	3+					71
178HF	72					2.008	4+,3+	72
178HF	73					2.014	3+,4+,5+	73
178HF	74					2.021	1+,2+,3+	74
178HF	75					2.024	(0+)	75
178HF	76	2.026	0+					76
178HF	77			2.028	4-			77
178HF	78	2.050	3+					78
178HF	79					2.056	(2+)	79
178HF	80	2.068	5+					80
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178HF	81	2.082	8+					81
178HF	82					2.100	3+,4+	82

178HF 83						2.119				83
178HF 84						2.137	(12)-			84
178HF 85						2.137	(8-)			85
178HF 86		2.150	12+							86 0.56 PS 2
178HF 87		2.154	8+							87
178HF 88						2.156				88
178HF 89						2.183	(9+)			89
178HF 90						2.203	(11-)			90
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178HF 91						2.203				91
178HF 92						2.227				92
178HF 93						2.248	1			93
178HF 94						2.255				94
178HF 95						2.273				95
178HF 96						2.310				96
178HF 97		2.316	9+							97
178HF 98						2.316	(0+)			98
178HF 99						2.334	1			99
178HF 100		2.350	9+							100
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178HF 101						2.354				101
178HF 102						2.365	(2+)			102
178HF 103						2.393				103
178HF 104						2.432	(1,2)			104
178HF 105						2.433	(13)-			105
178HF 106						2.434	(10+)			106
178HF 107						2.435				107
178HF 108						2.439	1			108
178HF 109						2.440	(10+)			109
178HF 110		2.446	16+							110 31 Y 1
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178HF 111						2.463				111
178HF 112						2.475				112
178HF 113						2.485	(12-)			113
178HF 114						2.508				114
178HF 115		2.538	10+							115
178HF 116						2.553				116
178HF 117						2.558				117
178HF 118					2.572 14-					118 68 US 2
178HF 119		2.604	10+							119
178HF 120						2.613	1			120
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178HF 121						2.631				121
178HF 122						2.668	(2+)			122
178HF 123						2.701	(11+)			123
178HF 124						2.707				124
178HF 125						2.738				125
178HF 126						2.749	(14-)			126
178HF 127		2.777	14+							127 0.33 PS 7
178HF 128						2.785	(13-)			128

178HF 129		2.798	11+						129
178HF 130		2.803	17+						130
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178HF 131						2.828	1		131
178HF 132		2.828	11+						132
178HF 133						2.840	1		133
178HF 134						2.866			134
178HF 135						2.894	1		135
178HF 136						2.899			136
178HF 137						2.909	(15-)		137
178HF 138						2.916	1		138
178HF 139						2.942	(12+)		139
178HF 140						2.958			140
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178HF 141						2.987	(12+)		141
178HF 142						3.019	1		142
178HF 143						3.053	(12+)		143
178HF 144					3.084	15-			144
178HF 145						3.101			145
178HF 146						3.101	(14-)		146
178HF 147						3.113			147
178HF 148		3.135	12+						148
178HF 149						3.144	1		149
178HF 150		3.181	18+						150
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178HF 151					3.264	16-			151
178HF 152		3.284	13+						152
178HF 153						3.293	1		153
178HF 154		3.336	13+						154
178HF 155		3.380	13+						155
178HF 156						3.410	1		156
178HF 157		3.435	16+						157
178HF 158						3.453	1		158
178HF 159						3.522	(14+)		159
178HF 160						3.546	1		160
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178HF 161						3.572	1		161
178HF 162						3.578	1		162
178HF 163		3.578	19+						163
178HF 164						3.589	1		164
178HF 165		3.595	14+						165
178HF 166						3.610	1		166
178HF 167		3.625	14+						167
178HF 168						3.626	(1,2)		168
178HF 169						3.711	1		169
178HF 170		3.741	14+						170
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178HF 171						3.773	1		171
178HF 172						3.824	1		172
178HF 173						3.890	1,2		173

178HF 174		3.902	15+				174
178HF 175						3.909	175
178HF 176						3.925	176
178HF 177		3.928	15+				177
178HF 178						3.932	178
178HF 179		3.996	20+				179
178HF 180		3.997	15+				180
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178HF 181		4.119	18+				181
178HF 182						4.179	182
178HF 183						4.210	183
178HF 184						4.325	184
178HF 185						4.378	185
178HF 186		4.417	16+				186
178HF 187		4.432	21+				187
178HF 188						4.593	188
178HF 189						4.782	189
178HF 190		4.837	20+				190
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178HF 191						4.874	191
178HF 192						4.886	192
178HF 193						4.915	193
178HF 194						5.010	194
178HF 195						5.283	195
178HF 196						5.389	196

S-p = 7.340 ( 0.002)-----  
S-n = 7.626 ( 0.002)-----  
S-2p = 13.522 ( 0.001)-----  
S-2n = 14.002 ( 0.002)-----  
S-alpha= -2.084 ( 0.000)-----

S+p = -5.211 ( 0.002)  
S+n = -6.099 ( 0.002)  
S+2p = -11.779 ( 0.002)  
S+2n = -13.487 ( 0.002)  
S+alpha = 1.764 ( 0.002)

gap p = 2.129 ( 0.003)  
gap n = 1.527 ( 0.003)  
gap 2p = 1.743 ( 0.002)  
gap 2n = 0.515 ( 0.003)  
gap alpha = -0.320 ( 0.002)