
Contents

1	Horizons	1
1.1	The Horizon of Accessibility	3
1.2	Forbidden Rooms in the Universe	6
1.3	Ultimate Constituents	8
1.4	The End of the Earth	9
1.5	The Roof of Heaven	12
2	The Vanishing Stars	19
2.1	The Speed of Light	19
2.2	Why Is the Sky Dark at Night?	29
2.3	The Big Bang	33
2.4	Cosmic Inflation	37
2.5	The Absolute Elsewhere	38
3	The Secret Glow of Black Holes	43
3.1	The Escape Velocity	43
3.2	Tidal Effects	48
3.3	The Sea of Unborn Particles	51
3.4	Invisible Light on the Horizon	54
4	The Visions of an Accelerating Observer	59
4.1	Gravity and Acceleration	61
4.2	A Total End of Communication	63
4.3	The Temperature of the Vacuum	64
4.4	Lightning in Empty Space	66
4.5	Quantum Entanglement	67
5	The Smallest Possible Thing	71
5.1	Why Does the Sun Shine?	77
5.2	The Strong Nuclear Interaction	78
5.3	The Weak Nuclear Interaction	84
5.4	The Quarks	88
5.5	The Standard Model	95
5.6	The Confinement Horizon	98

6	Quark Matter	103
6.1	Quarks Become Deconfined	105
6.2	Collective Behavior	108
6.3	The Ultimate Temperature of Matter	112
6.4	The Little Bang	114
6.5	Universal Hadrosynthesis	118
6.6	How Hot is the Quark–Gluon Plasma?	121
7	Hidden Symmetries	125
7.1	The Ising Model	130
7.2	Shadow Particles	136
7.3	Local Symmetries	138
7.4	Primordial Equality	140
8	The Last Veil	147
8.1	Ultimate Horizons in Time	148
8.2	Ultimate Horizons in Space	151
8.3	The End of Determinacy	152
8.4	Hyperspace	154
8.5	Cosmic Connections	156
	Notes on Notation	161
	Further Reading	165
	Author Index	167
	Index	171

Ultimate Horizons

Probing the Limits of the Universe

Satz, H.

2013, XII, 172 p. 68 illus., 53 illus. in color., Hardcover

ISBN: 978-3-642-41656-9