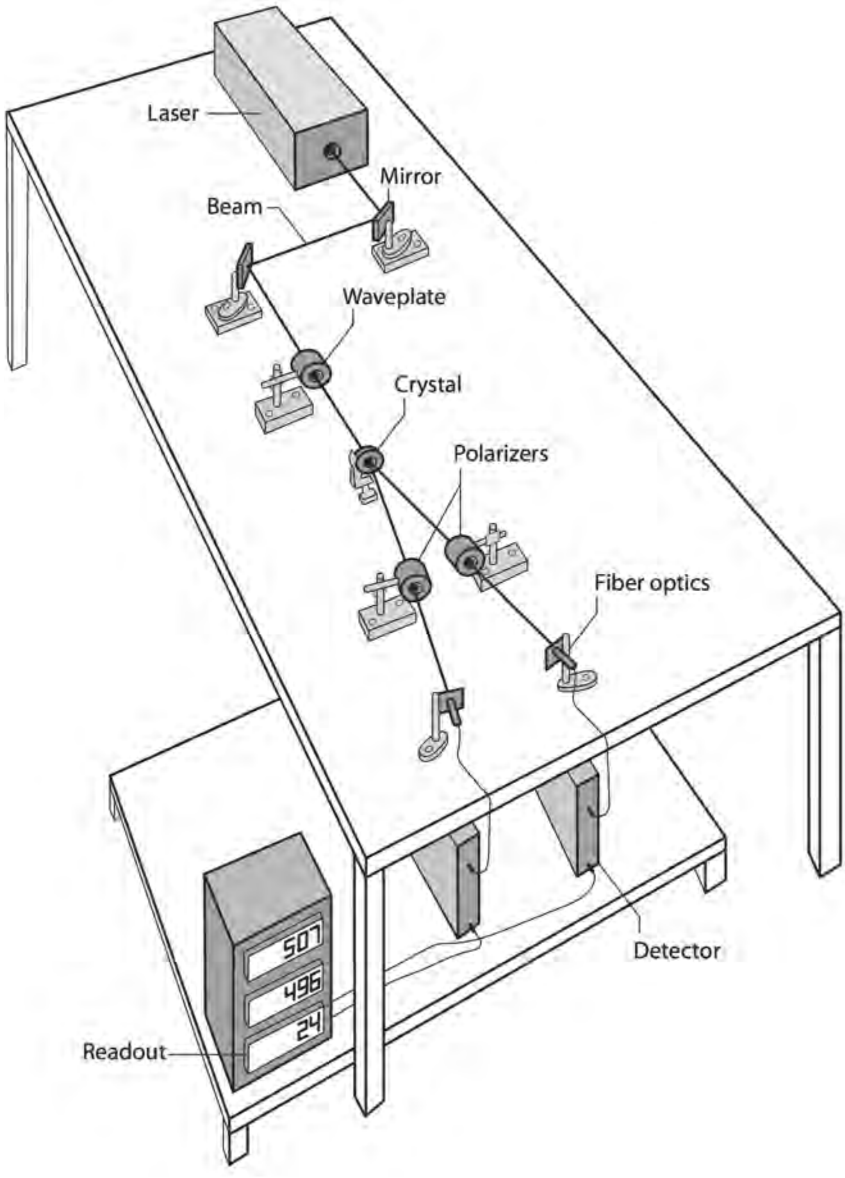
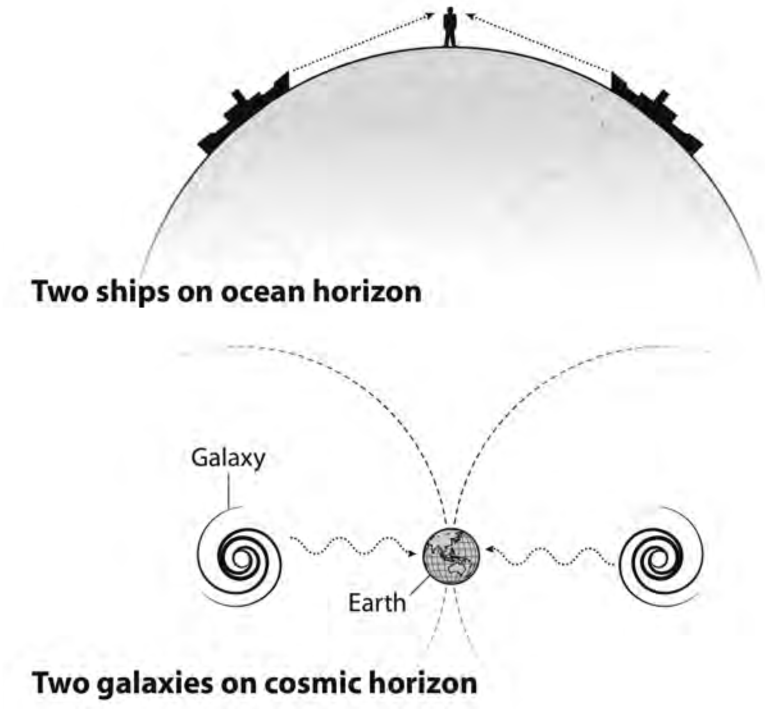


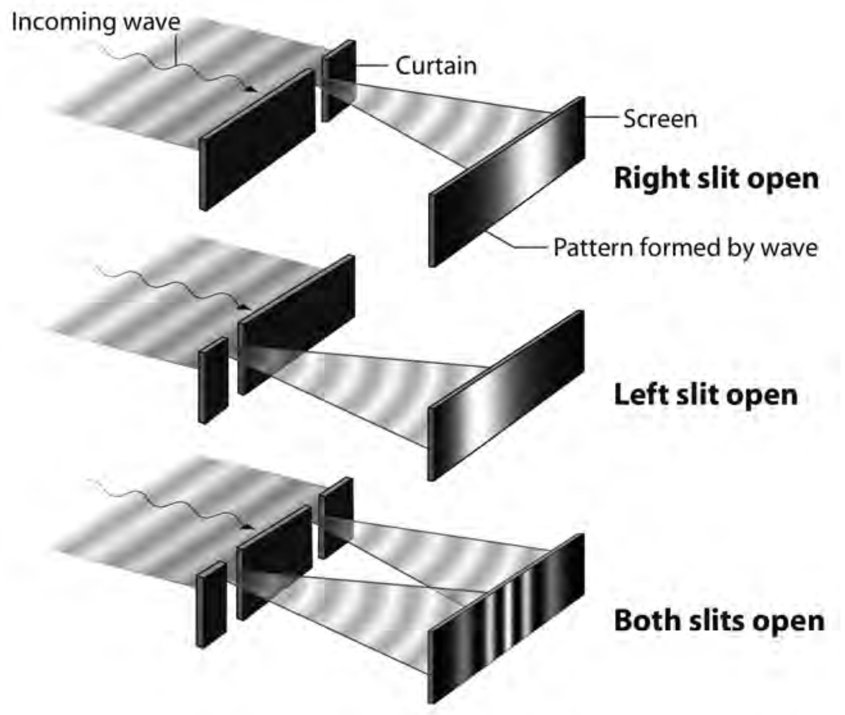
1.1. Setup of quantum entanglement experiment. (Illustration by Jen Christensen)

Normal Coins		Quantum Entangled Coins	
Left Coin	**Right Coin**	**Left Coin**	**Right Coin**
heads	tails	heads	heads
tails	tails	tails	tails
heads	heads	heads	heads
tails	tails	tails	tails
tails	heads	tails	tails
tails	heads	tails	tails
heads	tails	heads	heads
heads	heads	heads	heads

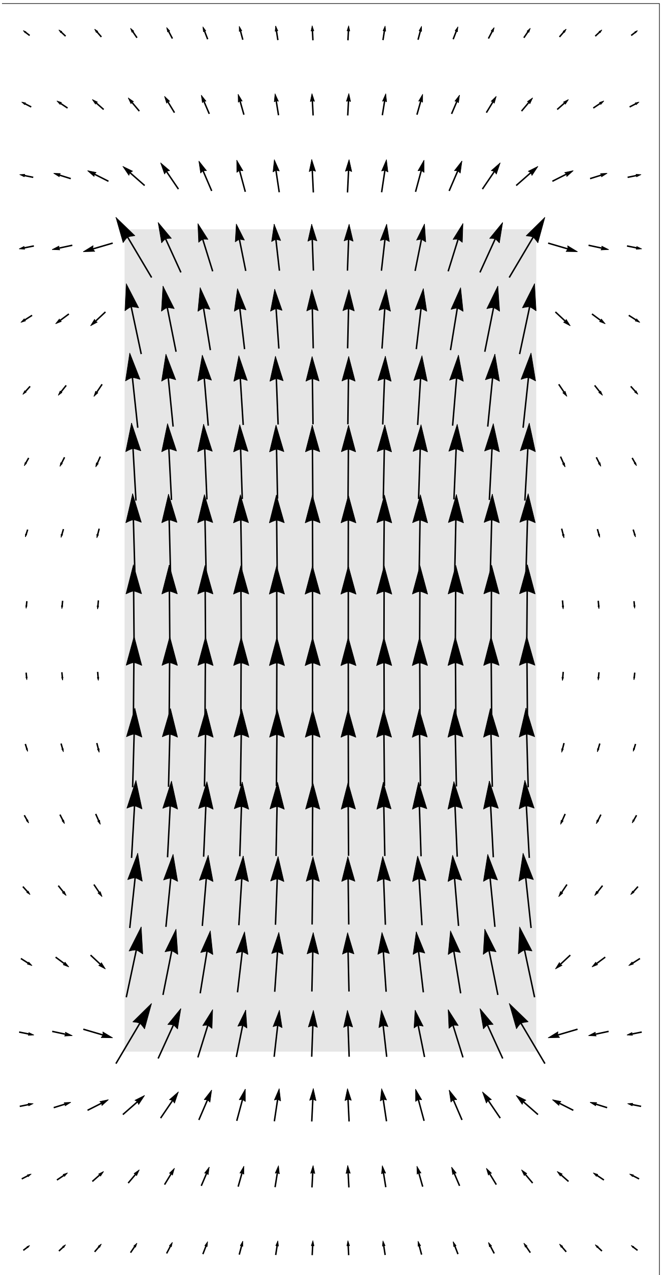
1.2. Sample results of coins experiment. If you flip a pair of ordinary coins, they'll land on the same side half the time, on average. But if you flip a pair of suitably prepared quantum entangled "coins," they will *always* land on the same side.



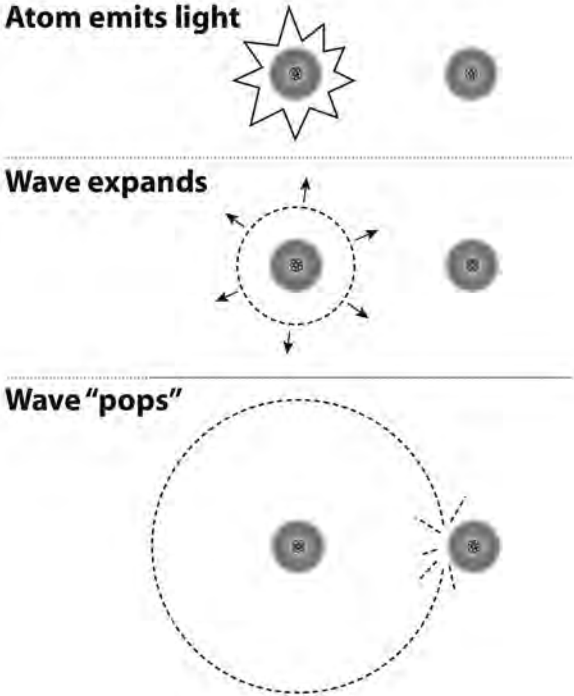
1.3. Cosmological horizon problem. We can see two ships on the ocean horizon even when they can't see each other (*top*). Similarly, we can see two galaxies on our cosmic horizon even when they can't see each other (*bottom*). If those galaxies have never been in contact, what could have made them look so similar? (Illustration by Jen Christensen)



2.1. Two-slit experiment. If you open a slit in a dark curtain, light waves will illuminate a spot on a screen. If you open two slits, the waves will overlap and create a striped pattern, called "interference fringes." (Illustration by Jen Christensen)



2.2. Magnetic field. The magnetic field fills the space in and around a bar magnet. It exerts a force of a certain strength and direction on magnetic objects such as iron filings. (Illustration by the author)



3.1. Einstein's bubble paradox. Einstein devised this paradox in 1909 to argue that atoms emit light as discrete particles rather than continuous waves. A continuous wave would expand outward from an atom in a growing sphere like an inflating soap bubble. When the wave hit another atom, it would pop—the energy spread around the circumference would be focused in that one place. That would be a nonlocal process, which Einstein and his contemporaries thought implausible. It makes more sense to say that the first atom emits a particle in the direction of the second atom. Later Einstein extended the paradox from light waves to quantum wavefunctions. (Illustration by Jen Christensen)

YOU		YOUR FRIEND		
Choice of Hand	Result of Coin Toss	Choice of Hand	Result of Coin Toss (for cheat coins)	Result of Coin Toss (for nonlocal coins)
left	heads	left	heads	heads
left	tails	right	tails	**heads**
left	tails	left	tails	tails
right	heads	right	heads	heads
right	tails	right	tails	tails
left	tails	right	tails	**heads**
right	heads	left	heads	heads
right	heads	left	heads	heads

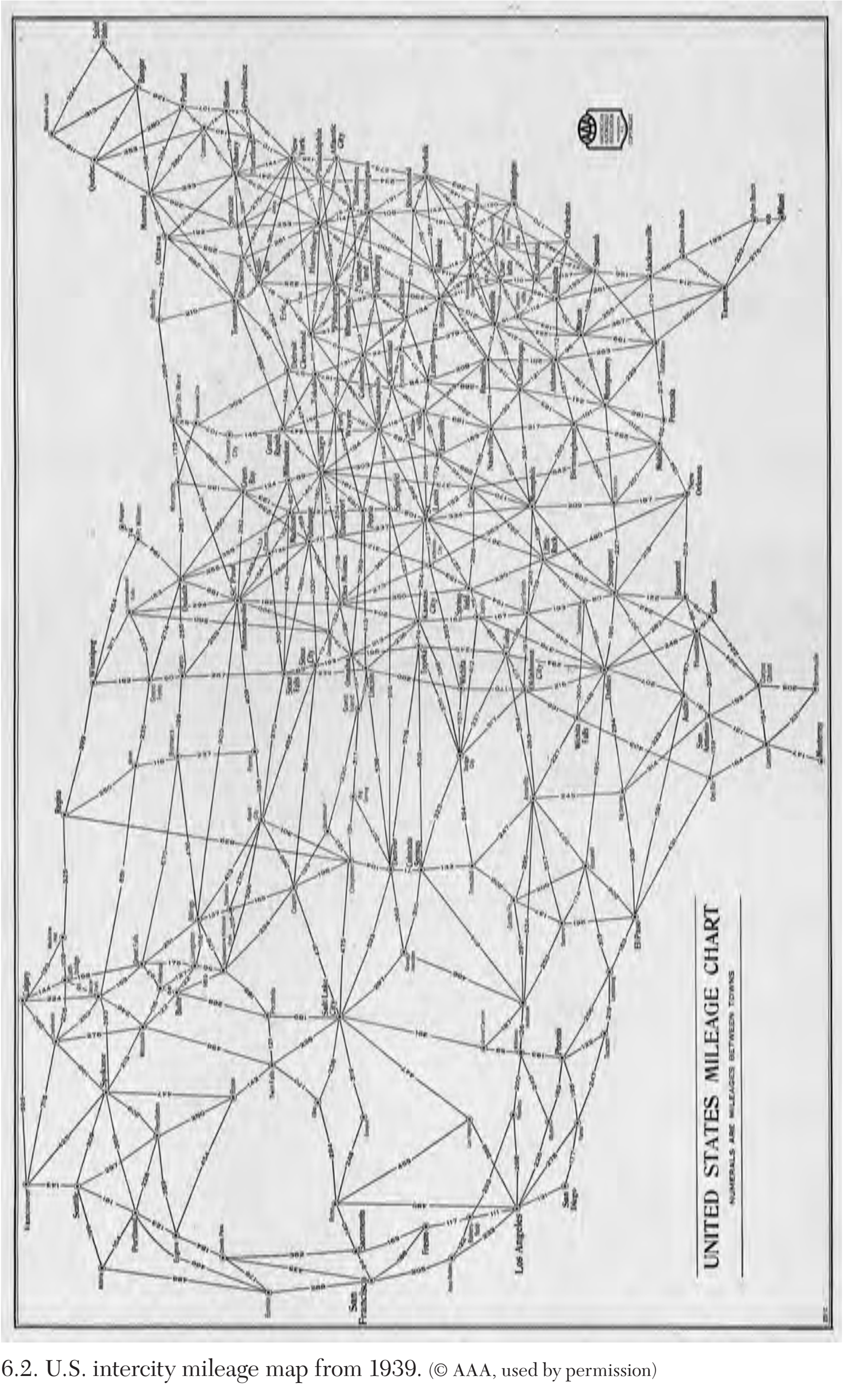
4.1. Test to distinguish true nonlocality from fakery. You and a friend flip coins with either your left or right hands, chosen at random. If the outcome has been fixed in advance—for instance, using cheat coins—the choice of hand won't matter. But if the coins are acting nonlocally, the choice can have an effect. In this example, the results in boldface mark deviations that indicate nonlocality is operating.

* The video is posted on the book's website, spookyactionbook.com.

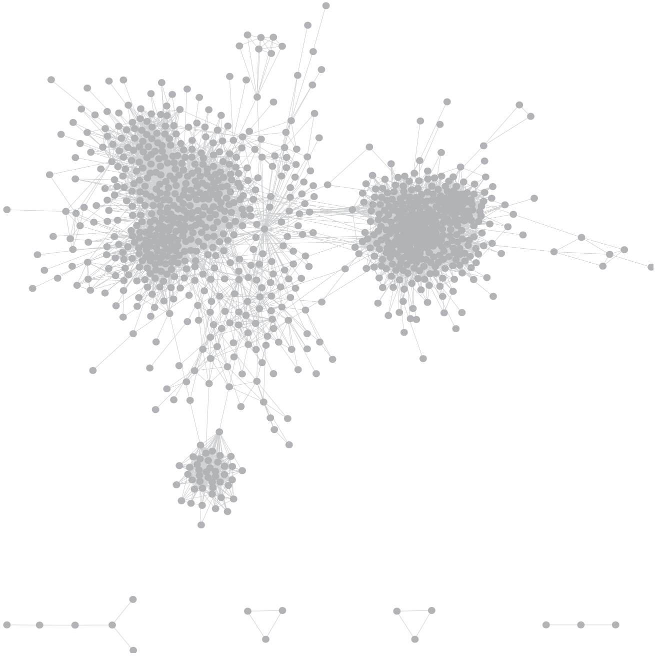
5.1. Boundary versus bulk. The universe may have a boundary, and if it does, physical processes occurring on the boundary can reproduce everything that is happening within the full volume of space. (Illustration by Jen Christensen)

	Atlanta	Boston	Chicago	Cleveland	Dallas	Denver	Detroit	Las Vegas	Los Angeles	Miami	Minneapolis	New Orleans	New York City	Orlando	Phoenix	St. Louis	Salt Lake City	San Francisco	Seattle
Boston	1106 16:18																		
Chicago	719 10:34	987 14:24																	
Cleveland	709 10:21	639 9:14	346 5:11																
Dallas	783 11:27	1772 25:40	967 13:56	1194 17:17															
Denver	1404 20:14	1975 28:28	1005 14:28	1334 19:19	879 12:50														
Detroit	721 10:26	814 11:53	282 4:17	176 2:47	1194 17:09	1270 18:11													
Las Vegas	2040 29:12	2718 39:11	1748 25:11	2077 30:02	1316 18:56	747 10:57	2012 28:54												
Los Angeles	2218 31:43	2988 42:55	2016 28:55	2345 33:46	1437 20:28	1016 14:41	2281 32:36	270 3:52											
Miami	664 9:47	1505 22:08	1391 20:26	1243 18:09	1363 19:43	2073 30:04	1390 20:16	2676 38:31	2741 39:12										
Minneapolis	1128 16:10	1402 20:24	408 5:57	761 11:14	988 14:15	915 13:06	697 10:07	1657 23:49	1926 27:33	1797 26:00									
New Orleans	460 6:55	1526 22:19	926 13:19	1065 15:33	520 7:43	1396 20:23	1064 15:26	1833 26:31	1898 27:11	866 12:32	1295 18:37								
New York City	883 12:57	218 3:40	790 11:41	463 6:53	1549 22:21	1779 25:45	614 9:06	2521 36:28	2790 40:12	1290 18:49	1206 17:40	1303 18:56							
Orlando	438 6:26	1298 19:06	1163 17:07	1035 15:09	1136 16:26	1846 26:47	1163 16:59	2449 35:15	2514 35:56	240 3:51	1570 22:45	639 9:15	1083 15:50						
Phoenix	1846 26:32	2700 38:45	1803 25:56	2067 29:42	1065 15:19	909 12:59	2036 29:31	291 4:30	372 5:17	2369 34:02	1791 25:33	1527 22:01	2466 35:43	2142 30:46					
St. Louis	554 8:02	1193 17:13	297 4:21	560 8:12	629 9:25	850 12:17	530 7:59	1596 22:59	1825 26:03	1223 17:52	535 8:21	675 9:51	959 14:15	996 14:35	1502 21:34				
Salt Lake City	1921 27:28	2369 33:55	1399 20:00	1728 24:43	1404 20:10	524 7:54	1664 23:42	419 6:03	688 9:46	2590 37:19	1309 18:38	1921 27:44	2173 31:13	2359 34:04	651 9:56	1366 19:31			
San Francisco	2488 36:00	3103 44:26	2133 30:26	2462 35:17	1815 25:58	1268 18:03	2397 34:09	570 8:27	380 5:33	3119 44:41	2042 29:04	2277 32:40	2906 41:43	2891 41:21	750 10:45	2099 29:56	735 10:35		
Seattle	2696 38:29	3057 43:54	2063 29:31	2417 34:48	2199 31:29	1331 19:00	2352 33:40	1257 17:54	1142 16:29	3365 48:20	1657 23:42	2717 39:02	2862 41:14	3138 45:02	1512 21:40	2142 30:32	840 12:01	815 11:56	
Washington, DC	638 9:18	443 7:00	697 10:35	367 5:53	1330 19:13	1680 24:31	520 7:57	2427 35:14	2675 38:14	1056 15:12	1112 16:35	1084 15:54	228 3:41	849 12:12	2352 33:42	839 12:27	2080 30:04	2813 40:37	2768 40:08

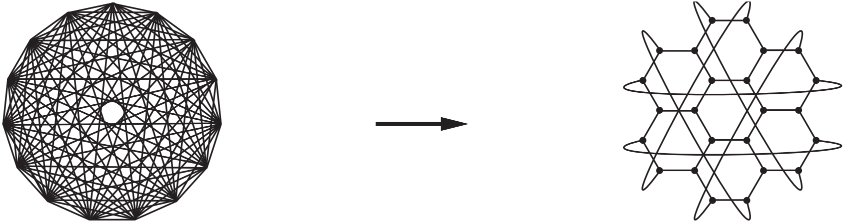
6.1. Intercity mileage and travel time chart. (© AAA, used by permission)



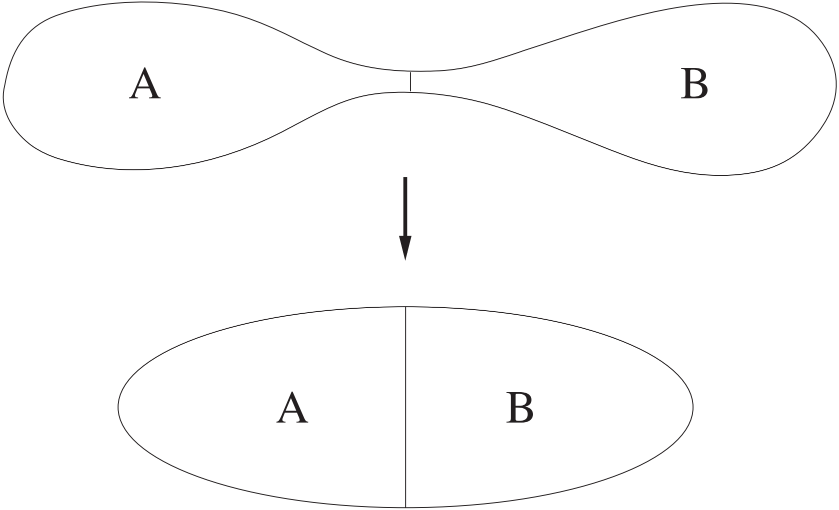
6.2. U.S. intercity mileage map from 1939. (© AAA, used by permission)



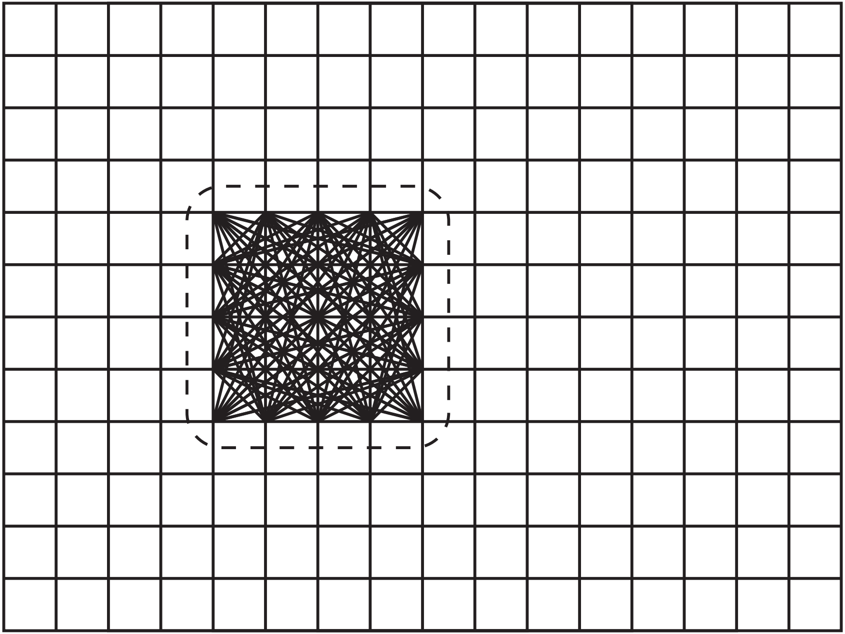
6.3. Facebook friends network. (Wolfram Alpha LLC, 2014, used by permission)



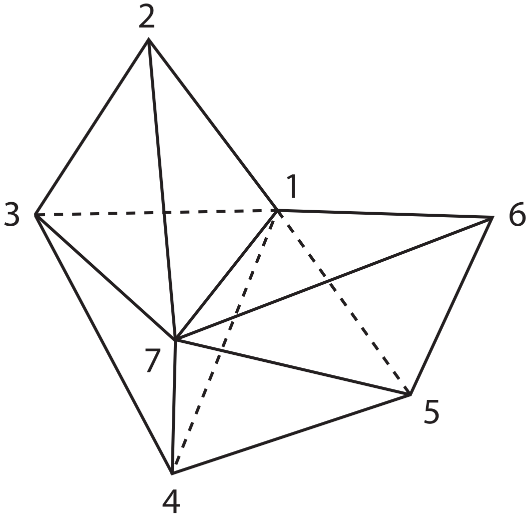
6.4. Quantum graphity model of space. In a high-energy network (*left*), every point is connected to every other point. In a low-energy network (*right*), every point is connected only to a few others, which become its nearest neighbors in the structure of space. (Courtesy of Fotini Markopoulou)



6.5. Connectivity of space. As two parts of the universe become increasingly entangled with each other, they draw closer together. (Courtesy of Mark Van Raamsdonk)



6.6. Quantum graphity model of a black hole. The black hole is a cosmic maze—anything that falls in can emerge only with difficulty. (Courtesy of Alioscia Hamma)



7.1. A portion of the amplituhedron that corresponds to the interaction of seven particles. (Courtesy of Jaroslav Trnka)