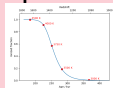


Timeline

| Time after Big Bang | T / K | Color of Universe | Energy of radiation | Distance to horizon | Radius of today's obs. Uni. | H(t) / km s ^{−1} Mpc ^{−1} | Density / g cm ^{−3} | Epoch | Event | Scale factor a | Redshift z | Photon density / cm ^{−3} | Photon mean free path | Photon pressure / atm | |
|---------------------|--------|--|---------------------|----------------------|-----------------------------|---|------------------------------|--|---|-----------------------------|------------|-----------------------------------|--|-----------------------|--|
| <1e-43 s | 1e32 | <div></div> | 1e16 TeV | | | | | Planck epoch | Gravity separates | | | No photons | | | |
| <1e-36 s | | <div></div> | | | | | | Grand Unification Epoch | X and Y bosons allow early matter to fluctuate between baryon and lepton states | | | | | | |
| 1e-36 s | 1e27/8 | <div></div> | 1e11/12 TeV | | 1e-23 cm | | | Inflation | Strong force separates. X and Y bosons decay to e.g. W, Z and Higgs bosons. | | | | | | |
| 1e-32/3 | 1e22 | <div></div> | 1e6 TeV | 1e-32 cm | 10 m | 1e51 | 1e70 | | Inflation ends | 2e-26 | 5e25 | 5e79 | Electrons and positrons haven't yet annihilated, so mop much smaller | | |
| 1e-12 s | 1e16 | <div></div> | 1 TeV | 5 Å | 0.6 AU | 1e31 | 1e30 | Quark epoch | Weak force and EM force separates. Matter particles acquire mass. | 2e-16 | 5e15 | 5e49 | | | |
| 1.7e-9 | 3e14 | <div></div> | 28 GeV | 5 μm | 24 AU | 1 c / m | 6e23 | | | 8e-15 | 1e14 | 7e23 | | 1e35 | |
| 1e-6 s | 1e13 | <div></div> | 1 GeV | 1 cm | 600 AU | 1e25 | 9e17 | Hadron epoch | Quarks form hadrons | 2e-13 | 5e12 | 5e40 | | 3e29 | |
| 1 s | 1e10 | <div></div> | 1 MeV | 500 km | 10 lyr | 1e19 | 9e5 | Lepton epoch | Hadrons and antihadrons annihilate. Neutrinos decouple | 2e-10 | 5e9 | 5e31 | | 3e17 | |
| 10 s | 4e9 | <div></div> | 0.4 MeV | 8000 km | 10 pc | 1e18 | 1 kg/cm ³ | Photon epoch | Leptons and antileptons annihilate. | 6e-10 | 2e9 | 2e30 | 20 m | 3e15 | |
| 3 min | 1e9 | <div></div> | 100 keV | 1 ls | 40 pc | 9e16 | 28 | | Nuclesynthesis begins | 3e-9 | 4e8 | 2e28 | ~1 km | 1e13 | |
| 15 min | 4e8 | <div></div> | 40 keV | 2e6 km | 90 pc | 2e16 | 1 | | Nuclesynthesis ends | 6e-9 | 2e8 | 2e27 | 16 km | 4e11 | |
| 1 yr | 2e6 | <div></div> | 200 eV | 7000 AU | 16 kpc | 5e11 | 9e-10 | | | 1e-6 | 9e5 | 3e20 | 0.7 AU | 300 | |
| 18 yr | 6e5 | <div></div> | 50 eV | 1 pc | 70 kpc | 3e10 | 3e-12 | | | 5e-6 | 2e5 | 4e18 | 50 AU | 1 | |
| 52 kyr | 9200 | <div></div> | 0.8 eV | 32 kpc | 4.2 Mpc | 1e7 | 2e-19 | Matter epoch begins | Radiation-matter equality | 3e-4 | 3371 | 2e13 | 60 pc | 7e-8 | |
| ~100 kyr | 6000 | <div></div> | 0.5 eV | ~75 kpc | 6 Mpc | 5e6 | 5e-20 | | Universe glows white | 5e-4 | ~2200 | 5e12 | 200 pc | 1e-8 | |
| ~200 kyr | ~4500 | <div></div> | 0.4 eV | 140 kpc | 9 Mpc | 3e6 | 2e-20 | Recombination epoch  | Ionized fraction begins to drop | 6e-4 | ~1600 | | 600 pc | | |
| 372 kyr | 2980 | <div></div> | 0.25 eV | 260 kpc | 13 Mpc | 1.5e6 | 4.5e-21 | | | 9e-4 | 1090 | 5e11 | 390 kpc | | |
| 379 kyr | 2940 | <div></div> | | 270 kpc | | | | | Decoupling (map ~ 2r _{hor}) | | | | 540 kpc | | |
| 1 Myr | 1614 | <div></div> | 0.14 eV | 730 kpc | 24 Mpc | 6e5 | 7e-22 | "Visibility epoch" (Andersen+2018) | Universe becomes fainter than the Sun viewed from Earth | 2e-3 | 600 | 9e10 | 650 Gpc | 7e-11 | |
| 5.5 Myr | 559 | <div></div> | 50 meV | 4 Mpc | 70 Mpc | 1e5 | 2e-23 | | Universe becomes fainter than a candle at 2.6 km. | 5e-3 | 200 | 4e9 | 1e4 Gpc | | |
| 10 Myr | 380 | <div></div> | 33 meV | 8 Mpc | 100 Mpc | 63e3 | 8e-24 | Dark Ages | | 7e-3 | 140 | 1e9 | 1e7 Gpc | | |
| 15 Myr | 20 °C | <div></div> | 25 meV | 12 Mpc | 130 Mpc | 42e3 | 3e-24 | | | 9e-3 | 110 | 5e8 | | | |
| 17 Myr | 0 °C | <div></div> | 23meV | 14 Mpc | 140 Mpc | 38e3 | 3e-24 | | | 0.01 | 100 | 4e8 | | | |
| ~100 Myr | ~100 | <div></div> | 7 meV | ~100 Mpc | ~500 Mpc | 6500 | 5e-16 | | Gravitational collapse | 0.03 | 30 | 1e7 | | | |
| 180 Myr | 57 | Star formation shifts the color from being temperature-dominated to being dominated by stars | 5 meV | 150 Mpc | 700 Mpc | 3600 | 2e-26 | Epoch of Reionization | First stars form | 0.05 | 20 | 4e6 | | | |
| 410 Myr | 33 | | 3 meV | 350 Mpc | 1.2 Gpc | 1600 | 5e-27 | | Most distant, spectroscopically confirmed, galaxy: GN-z11 | 0.08 | 11.09 | 7e5 | 1e10 Gpc | | |
| 562 Gyr | 27 | | 2 meV | 500 Mpc | 1.5 Gpc | 1200 | 3e-27 | | Planck-inferred z _{re} Ultra-VISTA LAEs | 0.1 | 8.8 | 4e5 | | | |
| ~1 Gyr | ~20 | | ~1 meV | ~1 Gpc | ~2 Gpc | ~650 | ~1e-27 | Galaxy epoch begins | Gunn-Peterson trough disappears | ~0.15 | ~5.7 | ~1e5 | | | |
| 10.2 Gyr | 3.5 | | | 0.3 meV | 10 Gpc | 11 Gpc | 80 | 1e-29 | Dark energy epoch | Matter-dark energy equality | 0.76 | 0.3 | 920 | | |
| 13.8 Gyr | 2.725 | <div></div> Cosmic latte | 0.2 meV | 14.2 Gpc 46.3 Gly | | 67.81 | 8.6e-30 | Today | | 1 | 0 | 411 | 2e13 Gpc | 5.5e-22 | |