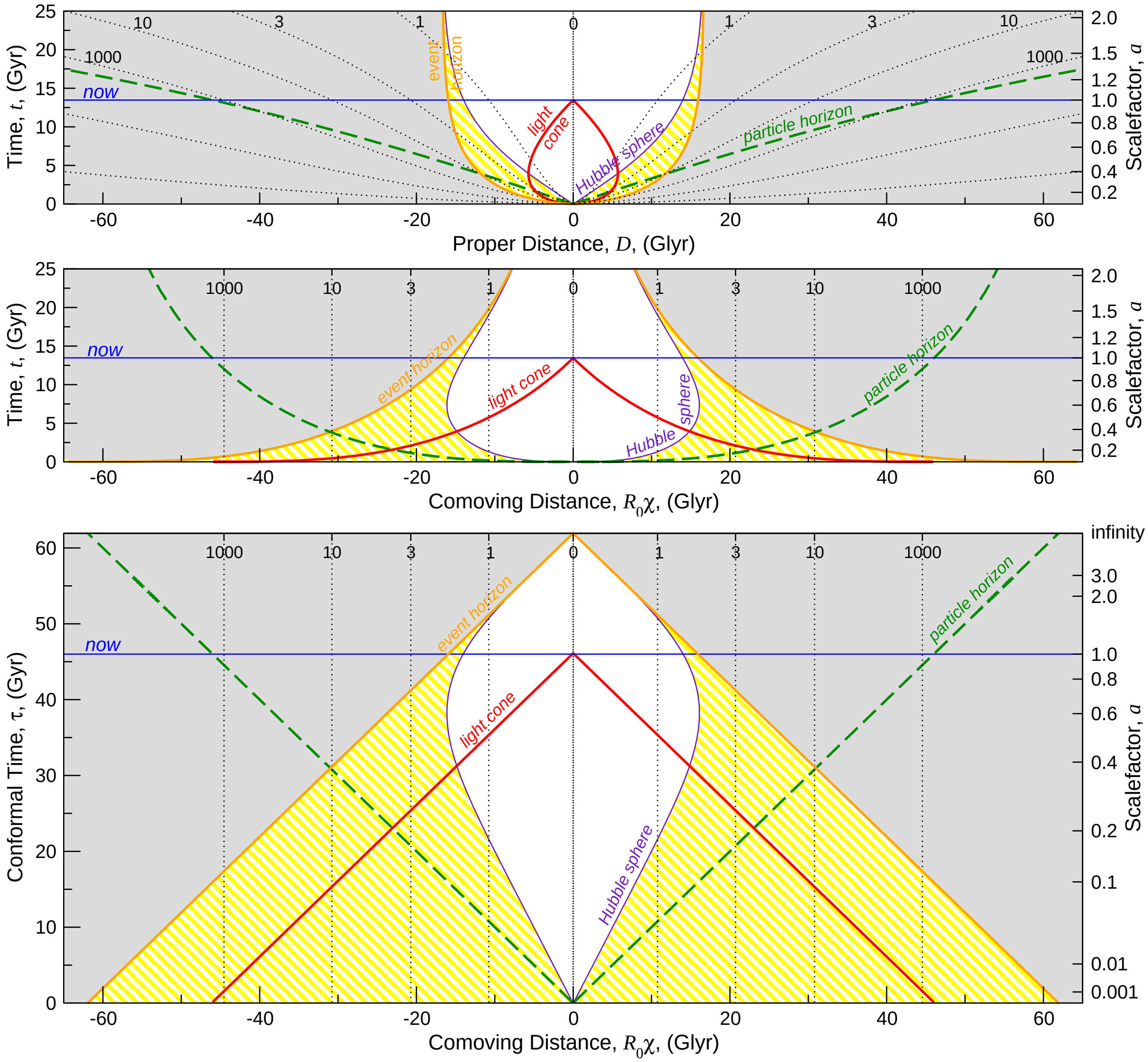

Figure 1: Spacetime diagrams for the $(\Omega_M, \Omega_\Lambda) = (0.3, 0.7)$ universe with $H_0 = 70\text{kms}^{-1}\text{Mpc}^{-1}$. Dotted lines show the worldlines of comoving objects. The current redshifts of the comoving galaxies shown appear labeled on each comoving worldline. The normalized scalefactor, $a = R/R_0$, is drawn as an alternate vertical axis. Our comoving coordinate is the central vertical worldline. All events that we currently observe are on our past light cone (the cone or "teardrop" with apex at $t = \text{now}$). All comoving objects beyond the Hubble sphere (thin solid line) are receding faster than the speed of light. The speed of photons on our past light cone relative to us (the slope of the light cone) is not constant, but is rather $v_{\text{rec}} - c$. Photons we receive that were emitted by objects beyond the Hubble sphere were initially receding from us (outward sloping lightcone at $t \lesssim 5$ Gyr, upper panel). Only when they passed from the region of superluminal recession $v_{\text{rec}} > c$ (yellow crosshatching and beyond) to the region of subluminal recession (no shading) could the photons approach us. More detail about early times and the horizons is visible in comoving coordinates (middle panel) and conformal coordinates (lower panel). Our past light cone in comoving coordinates appears to approach the horizontal ($t = 0$) axis asymptotically, however it is clear in the lower panel that the past light cone reaches only a finite distance at $t = 0$ (about 46 Glyr, the current distance to the particle horizon). Light that has been travelling since the beginning of the Universe was emitted from comoving positions which are now 46 Glyr from us. The distance to the particle horizon as a function of time is represented by the dashed green line. This is the distance to the most distant object we are able to observe at any particular time. Our event horizon is our past light cone at the end of time, $t = \infty$ in this case. It asymptotically approaches $\chi = 0$ as $t \to \infty$. Many of the events beyond our event horizon (shaded solid gray) occur on galaxies we can see (the galaxies are within our particle horizon). We see them by light they emitted billions of years ago but we will never see those galaxies as they are today. Galaxies with redshift $z \sim 1.8$ are just now passing over our event horizon. Galaxies with redshift $z \sim 1.45$ are just now receding at the speed of light. The vertical axis of the lower panel shows conformal time (proper time divided by the scalefactor). An infinite proper time is transformed into a finite conformal time so this diagram is complete on the vertical axis. The aspect ratio of $\sim 3/1$ in the top two panels represents the ratio between the size of the Universe and the age of the Universe, 46 Glyr/13.5 Gyr.