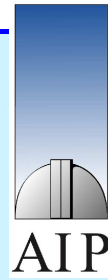


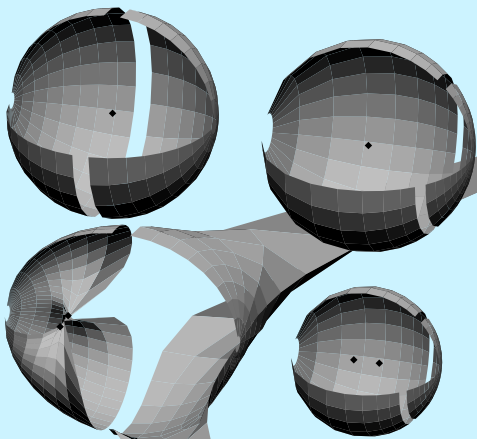
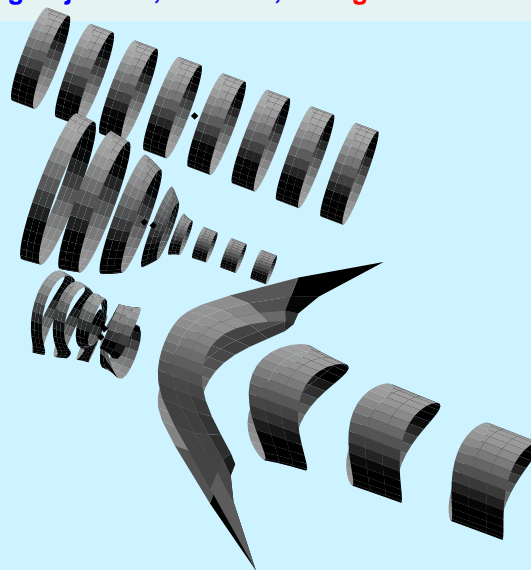
## Length Contraction is Visible

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Special Relativity predicts 4-dimensionally perspective effects like time dilation and length contraction. Time dilation is readily observed, but length contraction is more intricate because it requires simultaneity of read-off when measured locally, and it is mixed with aberration when it is observed at distance. The famous theorem of Terrell and Penrose tells that the map of the apparent sky to that of a moving observer is a conformal one and does not show any sign of length contraction in the direction of motion. The ordinary conclusion that the length contraction is not visible at flying objects is, however, **wrong**.

When we open the second eye, we see stereoscopically. More specific, when we combine the apparent skies of two (infinitesimally) distant eyes to a map of three three-dimensional space to the apparent three-dimensional space of the two-eyed observer, we obtain maps that are no more conformal. These maps **depend on the orientation of the pair of eyes**.



When the pair of eyes lies in line with the velocity (view out of the sideward window), lengths in the direction of motion are seen uniformly contracted by the Lorentz factor. In this case, they are compared with **the distance of the eyes that serves as ruler**. When the pair of eyes lies perpendicular to the direction of motion (view of the conductor), the picture becomes more complicated. The 3-dimensional map even contains singularities.

The often cited impression that the curious appearance of flying objects or the curious appearance of the field of view of a moving observer is an effect of (Special) Relativity is **wrong**. In Newton's theory of light as an high-speed emanation of particles, the qualitative properties of the maps considered are the same. Only the map of the sky is no more conformal, and the length contraction, of course, disappears.