Circulating Wave Model of Special Relativity

Roll sheet around the long axis to see the wave packets. Touch the ends of the gray line on the left (arrow tip to tail). Insert a rolled-up sheet of white paper for better visibility.

Left: Stationary standing wave packet propagating along circular paths ($\gamma = 1$)

Right: Moving wave packet propagating along helical paths ($\gamma = 2$)

Black lines represent wave crests traveling at the speed of light. Both wave packets have the same length of wave crests and the same spacing between crests along the circular direction. The gray arrow represents the distance light travels in one unit of time, as measured by a stationary observer. The internal clock ticks once each time the wave traverses the circle. The moving wave exhibits time dilation (gray arrow only goes halfway around), relativistic frequency increase (wavelength halves), length contraction (wave packet length halves), and the de Broglie wavelength: Let $hf_0 = m_0c^2$ for the stationary wave. The wavelength along the direction of average motion is then $\lambda_{||} = \lambda c/v = c^2/(\gamma f_0 v) = h/(\gamma m_0 v) = h/p$.

For a more complete explanation, see the book:

The Wave Basis of Special Relativity, by Robert A. Close (Verum Versa 2014)