36.25. **Model:** S′ is the electron's frame and S is the ground's frame. S′ moves relative to S with a speed $v = 0.99999997c$.

Solve: For an experimenter in the S frame, the length of the accelerator tube is 3.2 km. This is the proper length $\ell = L$ because it is at rest and is always there for measurements. The electron measures the tube to be length contracted to

$$L' = \sqrt{1-\beta^2}\,\ell = \sqrt{1-(0.99999997)^2}\,(3200\text{ m}) = 0.78\text{ m}$$