

$$E' = \frac{E \cosh \xi + c p_1 \sinh \xi}{\Delta}, \quad p'_1 = \frac{p_1 \cosh \xi + E \sinh \xi / c}{\Delta},$$

$$p'_2 = \frac{p_2}{\Delta}, \quad p'_3 = \frac{p_3}{\Delta},$$

$$\Delta = 1 + \frac{E(\cosh \xi - 1) + c p_1 \sinh \xi}{\kappa},$$