

78. Let the reference frame be  $S$  in which the particle (approaching the South Pole) is at rest, and let the frame that is fixed on Earth be  $S'$ . Then  $v = 0.60c$  and  $u' = 0.80c$  (calling “downwards” [in the sense of Fig. 38-31] positive). The relative speed is now the speed of the other particle as measured in  $S$ :

$$u = \frac{u' + v}{1 + u'v/c^2} = \frac{0.80c + 0.60c}{1 + (0.80c)(0.60c)/c^2} = 0.95c .$$