New tools for relativistic collision calculations

FELIX T. SMITH, Retired — In a varying and uncertain relativistic transition region of velocity the methods available for treating collisions change completely, not only because of the \( \frac{v}{c} \) change but in the need to go from a 3-space to a space-time geometry. For problems with 2 or more particles this seems to require 2 or more independent time variables, a complication unseen in the real world. In an alternative form of special relativity I have shown that Lorentz covariance is completely obeyed if one refers a single time variable to a cosmic proper time and uses a Hubble expanding position frame of a negative curvature hypersphere for the 3 position coordinates of each of the \( n \) particles. The cosmic dimensions of course change nothing on a local scale except to clarify the validity of using a single time. This change alone clarifies and simplifies treatment of the transition connecting nonrelativistic and relativistic domains. The variables most useful for such a treatment and the form of the \( \frac{v}{c} \) correction terms that are encountered will be exhibited.