1023-35-1197 **Ronghua Pan*** (panrh@math.gatech.edu), School of Mathematics, Georgia Institute of Technology, 686 Cherry Street, Atlanta, GA 30332, and **Joel A. Smoller** (smoller@umich.edu), Department of Mathematics, The University of Michigan, 525 E. University Avenue, Ann Arbor, MI 48109. *Blowup of smooth solutions for relativistic Euler equations.*

We study the singularity formation of smooth solutions of the relativistic Euler equations in $(3+1)$-dimensional spacetime for both finite initial energy and infinite initial energy. For the finite initial energy case, we prove that any smooth solution, with compactly supported non-trivial initial data, blows up in finite time. For the case of infinite initial energy, we first prove the existence, uniqueness and stability of a smooth solution if the initial data is in the subluminal region away from the vacuum. By further assuming the initial data is a smooth compactly supported perturbation around a non-vacuum constant background, we prove the property of finite propagation speed of such a perturbation. The smooth solution is shown to blow up in finite time provided that the radial component of the initial "generalized" momentum is sufficiently large. (Received September 25, 2006)