1056-83-633   **Moritz Andreas Reintjes*** (`moritz@math.ucdavis.edu`), 103 Grande Ave, Davis, CA 95616.
Shock Waves in General Relativity.

In this talk I am going to give a short glimpse on the theory of shock waves and introduce their relation to General Relativity, that is, shock waves appear in the matter fields of the Einstein Field Equation with a Perfect Fluid source. In addition I will discuss the regularity class of the metric if shocks are present, namely the constraint equation give rise to a metric that is no more smooth than Lipschitz continuous across the shock surface. However, for the Einstein equation to hold in a classical (almost everywhere) sense, we need the metric to be at least differentiable with Lipschitz continuous partial derivatives. For a single shock surface there always exists a coordinate system such that the metric is that regular, however, this construction fails if two shocks intersect. (Received September 15, 2009)