Parabolic Equations and General Covariance
Oscar Reula- Universidad Nacional de Córdoba

We analyze, in terms of a simple example, the incompatibility of parabolic evolution and general covariance. For this we introduce a unit time-like four-vector and study the simplest heat flux equation with respect to it. In cases where this vector field is surface forming then the local high wave number limit shows well posedness, but as soon as that property is lost the Cauchy problem becomes ill-posed. We also discuss how the Maxwell-Cattaneo type modification of the system renders it well posed and link the amplitude of the modification, which is related to the so-called second wave speed of the system, to the size of the failure of surface orthogonality