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Blow-up in the Parabolic Scalar Curvature Equation

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Consider a manifold foliated by topological 2-spheres. Suppose that the intrinsic geometry of the foliation spheres has been specified. We would like to obtain a manifold of prescribed scalar curvature in a non-conformal way by modifying the metric only in a direction transverse to the foliation spheres. That is, we want to find a function u so that the metric

$$g=u2dr2+h$$

has the desired scalar curvature R, where r is the foliating function and h denotes the metric of the foliation spheres. If the area element of h is expanding with increasing r then this gives rise to a parabolic equation for u in which r plays the role of a time variable. It is easily seen by using the maximum principle that in many cases of physical interest the solution blows up at some finite value of r, say r1. The purpose of this talk is to discuss a situation in which blow-up occurs in such a way that the metric can nonetheless be continuously extended up to
r1, which corresponds to a horizon.

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