

THE AMBIENT OBSTRUCTION TENSOR AND CONFORMAL HOLONOMY

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For Riemannian or semi-Riemannian conformal manifolds $(\mathcal{M}, c = [\mathbf{g}])$ the construction of local invariants is more complicated than for semi-Riemannian structures, where all local invariants can be derived from the Levi-Civita connection and its curvature. For conformal geometry, essentially there are two invariant constructions: the conformal ambient metric introduced by Fefferman and Graham and the normal conformal Cartan connection with the induced tractor calculus.

In the first part of this talk we give a self-contained introduction to these constructions, explain their geometric origin and exhibit some applications in conformal geometry. Based on this, we will investigate a new relationship between two essential ingredients of these invariant constructions, the ambient obstruction tensor on one hand (for even dimensional conformal structures), and the conformal holonomy on the other. The results shed a new light on the interplay between properties of the ambient obstruction tensor and special geometric structures in the conformal class. This is a joint project with Thomas Leistner (Adelaide).