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Surgery construction of Einstein metrics

We present a generalization of Thurston's Dehn surgery construction of hyperbolic 3-manifolds to Einstein metrics in any dimension. The construction produces large infinite families of new Einstein metrics. The structure of the volume spectrum of these manifolds is shown to be very similar to the volume spectrum of hyperbolic 3-manifolds, especially in dimension 4.

Time permitting, we also discuss the existence of Einstein metrics on manifolds with sufficiently pinched negative curvature, including those constructed by Gromov-Thurston and Farrell-Jones with exotic smooth structures.