Large area-constrained Willmore spheres in initial data sets

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Area-constrained Willmore spheres are surfaces that are particularly well-adapted to the Hawking mass, a local measure of the gravitational field of initial data sets for isolated gravitational systems. In this talk, I will present recent results (joint with M. Eichmair) on the existence and uniqueness of large area-constrained Willmore surfaces in such initial data sets. In particular, I will describe necessary and sufficient conditions on the scalar curvature of the initial data set that guarantee the existence of a unique asymptotic foliation by large area-constrained Willmore spheres. I will also discuss recent results on the geometric center of mass of this foliation.