Quantitative Alexandrov theorem and its applications in the volume preserving mean curvature flow

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A classical theorem in differential geometry, Alexandrov Theorem, states that if Σ is a closed connected embedded smooth surface in $\mathbb{R}^n$ $(n \geq 2)$, then it is a round sphere. In this talk, a new quantitative version of it will be given in $\mathbb{R}^3$. Using it we obtain a result on the asymptotic of weak solutions for the volume preserving mean curvature flow. Here, by weak solution we mean a flat flow, obtained via the minimizing movement scheme. The results discussed are obtained by a collaboration with V. Julin, M. Morini, and E. Spadaro.