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Wei Yuan* (wyuan2@ucsc.edu). *On the Geometry of Static Spaces.*

In 1975, A.Fischer and J.Marsden proposed a conjecture about the classification of the static spaces. It has been solved under the assumption of locally conformal flatness back in 1980's. But the generic case is still open. In this talk, we will give an improvement providing only Bach flatness and an even weaker one for dimension 3. Also using the same idea, we will give a confirmed answer to one of Bess's conjecture assuming Bach flatness. Inspired by the solution of Min-Oo's conjecture, we will investigate the scalar rigidity phenomenon in static spaces for the second part of the talk. We will give a sharp conformal rigidity result for static spaces with positive scalar curvature. As for generic static spaces, we will also discuss the corresponding rigidity phenomenon. In the end, with a careful analysis, we will give an improvement of some recent results concerning the rigidity of geodesic balls in upper hemisphere, which in some sense is almost optimal. This is a joint work with Professor Jie Qing in University of California, Santa Cruz. (Received February 11, 2014)