In the paper under review, the authors prove that a homogeneous flow on a connected finite volume homogeneous space either is smoothly isomorphic to a linear flow on a torus or has countably many independent invariant distributions of bounded order. Using this result and the method of suspension, they prove that an affine diffeomorphism on a connected finite volume homogeneous space either is smoothly isomorphic to an ergodic translation on a torus or has countably many independent invariant distributions of bounded order. They give a nice detailed proof of the suspension method and the reduction to the flow case in §3.

The phase space here is the quotient of a connected Lie group $G$ by a closed subgroup $D$ with $G/D$ carrying a finite $G$-invariant measure. In the case of flow one considers a one-parameter subgroup action on $G/D$ by left translations. Using Lie theory, the paper reduces the proof of the theorem to the case where $D$ is a discrete subgroup of $G$ and the finite volume measure on $G/D$ is ergodic with respect to the one-parameter subgroup action. Two basic cases when the one-parameter subgroup is quasi-unipotent and partially hyperbolic are considered separately using different methods. In the hyperbolic case, the authors use the full Hausdorff dimension result of D. Y. Kleinbock and G. A. Margulis [in Sinai’s Moscow Seminar on Dynamical Systems, 141–172, Amer. Math. Soc. Transl. Ser. 2, 171, Amer. Math. Soc., Providence, RI, 1996; MR1359098] and its corollaries to prove the existence of infinitely many different invariant probability measures.

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Note: This list reflects references listed in the original paper as accurately as possible with no attempt to correct errors.

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