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A Cartan action is an action of an abelian group generated by Anosov diffeomorphisms with 1-
dimensional fast-stable foliations that form a "trellis". This paper shows that these fast-stable
foliations are a topological invariant of a Cartan action on a compact infra-nilmanifold (i.e.,
equivariant under topological conjugacy of Cartan actions). For single Anosov diffeomorphisms

the fast-stable foliations are not topologically invariant (though Hurder asks whether this might hold if they are 1-dimensional), so this result depends on the presence of a commuting family. Important examples by R. de la Llave show (among many other things) that the result fails for trellises invariant only under a single Anosov diffeomorphism.

A corollary is the following smooth rigidity result: A Cartan action on a compact infranilmanifold with constant exponents (expansion rates) is smoothly conjugate to an affine action. (Topological equivalence to an affine action is provided essentially by the Franks-Manning classification of Anosov diffeomorphisms on infra-nilmanifolds, and Franks' methods are used here.)

A central ingredient is a transfer of information about Lyapunov exponents through the topological conjugacy by comparing them to eigenvalues of the induced action on homology (the eigenvectors are Schwartzman asymptotic cycles).

That Cartan actions abound was shown elsewhere by Hurder for the case of tori and by Qian for the case of nontoral infra-nilmanifolds.

## Reviewed by Boris Hasselblatt

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