Rigidity for partially hyperbolic diffeomorphism

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We completely classify smooth conjugacy for conservative partially hyperbolic diffeomorphisms homotopic to a linear Anosov automorphism on the 3-torus by its center foliation behavior. We prove that the uniform version of absolute continuity for the center foliation is the natural hypothesis to obtain smooth conjugacy to its linear Anosov automorphism. On a recent work Avila, Viana and Wilkinson proved that for a perturbation in the volume preserving case of the time-one map of an Anosov flow absolute continuity of the center foliation implies smooth rigidity. The absolute version of absolute continuity is the appropriate sceneario for our context since it is not possible to obtain an analogous result of Avila, Viana and Wilkinson for our class of maps, for absolute continuity alone fails miserably to imply smooth rigidity for our class of maps. Our theorem is a global rigidity result as we do not assume the diffeomorphism to be at some distance from the linear Anosov automorphism. We also do not assume ergodicity. In particular a metric condition on the center foliation implies ergodicity and smooth center foliation.