Deformation/spectral gap rigidity principle for von Neumann algebras and some applications to ergodic theory .

In this talk I will discuss Popa's *deformation/spectral gap rigidity* technique for von Neumann algebras and I will present some new applications to solidity and to ergodic theory. For instance, I will prove the folowing result: Suppose that $\Gamma \curvearrowright [0,1]^\Gamma$ is the Bernoulli action of a countable infinite group Γ and denote by $\mathcal{R}_{\Gamma \curvearrowright [0,1]^\Gamma}$ the induced equivalence relation. Then for *every* subequivalence relation $\mathcal{S} \subset \mathcal{R}_{\Gamma \curvearrowright [0,1]^\Gamma}$ there exists a measurable partition $\{X_i\}_{i \geq 0}$ of $[0,1]^\Gamma$ formed of $\mathcal{R}$-invariant sets such that $\mathcal{R}|_{X_0}$ is *hyperfinite* and $\mathcal{R}|_{X_i}$ is *strongly ergodic* (hence *non-hyperfinite* and *ergodic*) for every $i \geq 1$. This talk is based on two papers I have written jointly with A. Ioana respectively C. Houdayer.