Speaker: Ali Moatadelro

Title: A Riemann-Roch theorem for the noncommutative two torus

Abstract: We prove the analogue of the Riemann-Roch formula for the noncommutative two torus equipped with an arbitrary translation invariant complex structure and a Weyl factor rep- resented by a positive element $k \in C^{\infty}(T^2_{\theta})$. We consider a topologically trivial line bundle equipped with a general holomorphic structure and the corresponding twisted Dolbeault Laplacians. We define a spectral triple that encodes the twisted Dolbeault complex of A_{θ} and whose index gives the left hand side of the Riemann-Roch formula. We explicitly compute the b_2 terms of the asymptotic expansion of $Tr(e^{-tD^2})$. We also find that the curvature term on the right hand side of the Riemann-Roch formula coincides with the scalar curvature of the noncommutative torus recently defined and computed by Connes-Moscovici and Fathizadeh-Khalkhali.