Title: **Fourier-Mukai transforms and spectral data of harmonic tori into compact symmetric spaces**

Tetsuya Taniguchi (Kitasato University)

In this talk, we define an analogue of Fourier-Mukai transform. Applying it, we shall construct spectral data of harmonic maps of tori into compact symmetric spaces.

First we recall some definitions. Let $T = \mathbb{C}/(\mathbb{Z} \oplus \mathbb{Z}\tau)$ be a 1-dimensional complex torus and $\hat{T}$ the dual torus of T. $\hat{T}$ is also regarded as the moduli space $Pic^0(T)$ of line bundles of degree 0 on T. Let $\mathcal{P}$ be the Poincare bundle on $\hat{T} \times T$. In particular, if $p \in \hat{T}$ corresponds to a line bundle $\mathcal{L} \in Pic^0(T)$, then $P|_{\{p\}\times T}$ is isomorphic to $\mathcal{L}$. By using a modified Poincare bundle, we define an analogue of Fourier-Mukai transform.

We regard T as the 2-dimensional real torus with the conformal structure induced by τ. Let ϕ be a harmonic map from T to a compact symmetric space G/K. Let $\Phi_\lambda : \widetilde{T} \to G^{\mathbb{C}}$ be an extended frame of ϕ ($\lambda \in \mathbb{P}^* = \mathbb{C} \setminus \{0\}$) where $\widetilde{T}$ is the universal cover $\mathbb{C} \to T$. We denote the Maurer-Cartan form of Φ_λ by $\alpha_\lambda = \Phi_\lambda^{-1} d\Phi_\lambda$. For each $\lambda \in \mathbb{P}^*$, we consider the vector bundle $E(\lambda)$ on T associated to the representation of fundamental group of T induced by α_λ.

By applying the above analogue of Fourier-Mukai transform, we shall construct a spectral data $(X, \pi, \mathcal{L})$ which correponds to the familiy of vector bundles $\{E(\lambda) \mid \lambda \in \mathbb{P}^*\}$. Here, X is a complex curve in the product $\mathbb{P}^* \times H^1(T, \mathbb{C}^*)$ of $\mathbb{P}^*$ and the moduli space $H^1(T, \mathbb{C}^*) = \mathbb{C}^* \times \mathbb{C}^*$ of flat $\mathbb{C}^*$-bundles on T. And π is a map from X to $\mathbb{P}^*$ induced by the first projection $pr_1 \colon \mathbb{P}^* \times H^1(T, \mathbb{C}^*) \to \mathbb{P}^*$. And $\mathcal{L}$ is a sheaf on X.

Moreover, we also get a map L_X from T to the category of sheaves on X. In some cases, L_X is considered as a linear flow on the Picard group $Pic(\bar{X})$ of a compactification $\bar{X}$ of X.