# Lie Groups and Representation Theory Seminar at the University of Tokyo

## リー群論・表現論セミナー

DATE May 25 (Fri), 2007, 16:00–17:30

PLACE Room 122, Graduate School of Mathematical Sciences

SPEAKER **Soji Kaneyuki (金行壯二)**

TITLE Causalities, $G$-structures and symmetric spaces

ABSTRACT Let $M$ be an $n$-dimensional smooth manifold, $F(M)$ the frame bundle of $M$, and let $G$ be a Lie subgroup of $\mathrm{GL}(n,\mathbb{R})$. We say that $M$ has a *$G$-structure*, if there exists a principal subbundle $Q$ of $F(M)$ with structure group $G$. Let $C$ be a causal cone in $\mathbb{R}^n$, and let $\mathrm{Aut}\, C$ denote the automorphism group of $C$.

Starting from a causal structure $\mathcal{C}$ on $M$ with model cone $C$, we construct an $\mathrm{Aut}\, C$-structure $Q(\mathcal{C})$. Several concepts on causal structures can be interpreted as those on $\mathrm{Aut}\, C$-structures. As an example, the causal automorphism group $\mathrm{Aut}(M,\mathcal{C})$ of $M$ coincides with the automorphism group $\mathrm{Aut}(M,Q(\mathcal{C}))$ of the $\mathrm{Aut}\, C$-structure.

As an application, we will consider the unique extension of a local causal transformation on a Cayley type symmetric space $M$ to the global causal automorphism of the compactification of $M$.