

# 1 Aoki Group

**Subject:** Theoretical condensed-matter physics

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Our main interests are many-body and topological effects in electron and cold-atom systems, i.e., **superconductivity, magnetism and topological phenomena**, for which we envisage a **materials design for correlated systems** and novel **non-equilibrium** phenomena should be realised. Studies in the 2013 academic year include:

- **Superconductivity**

- High-Tc cuprates: material- and pressure-dependence [1-3]
- Coexisting electron-electron and electron-phonon interactions
  - Retardation effects, supersolid phases [4]
- Organic and carbon-based superconductors [1]
- Fermion and boson systems on flat-band systems [5]
- Superconductivity induced in non-equilibrium:

- **Topological systems**

- Topological and chiral properties of graphene [6-8]
- Optical (THz) quantum Hall effect in graphene [9]
- Graphene quantum dot [10]

- **Non-equilibrium phenomena**

- Non-equilibrium dynamical mean field and dynamical cluster theories[11,12]
- Dynamical phase transitions in correlated and topological systems
  - Floquet topological insulator
- Non-thermal fixed points
- Nonequilibrium quantum spin systems[13]
- Higgs modes in superconductors in intense laser [11]

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