

Summary of Breakout Session

# Material Science

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Electron and Lattice Dynamics  
and Phase Transition in Solids

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# Session Program

**Y. Kubota (T. Togashi )**

*Development of pump-probe X-ray diffraction system under low temperature*

**M. Suzuki**

**K. Yamamoto**

*Polarization control of hard X-ray FEL and application to ultrafast magnetization dynamics*

**I. Matsuda**

*Electronic Study in soft X-ray*

**T. Osaka**

*Picosecond dynamics measurements with split and delay optics in hard X-ray*

**T. Togashi**

*Electronic and lattice control from mid-IR to THz region*

# Discussion : Electron and Lattice Dynamics and Phase Transition in Solids

## Future directions in XFEL experiment for material science

- To trace evolutions of interactions between spin, charge, and lattice (phonon).
- By optical ignitions of spin, charge, or lattice (pump laser)
- For transitions under various environment (temperature)
- With spatial resolutions (velocity, operando)
- Seeded XFEL + phase retarder for circular polarization

# Discussion : Electron and Lattice Dynamics and Phase Transition in Solids

## Request to the facility for achieving our goal

- Laser (mid-IR  $\sim$  THz) characterizations (laser alignment) in advance
- Real time monitoring during the time-resolved measurement with high time-resolution
- Simultaneous measurement of X-ray absorption and emission
- FEL at photon energy of keV