



# KURODA LAB.

## [Research for Nonlinear Optical Devices]

Department of Fundamental Engineering

<http://qopt.iis.u-tokyo.ac.jp>

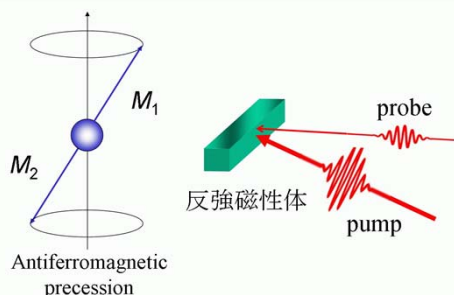
Quantum Optics

Department of Applied Physics  
School of Engineering

## Ultrafast coherent spin manipulation

Spin dynamics with femtosecond laser pulses

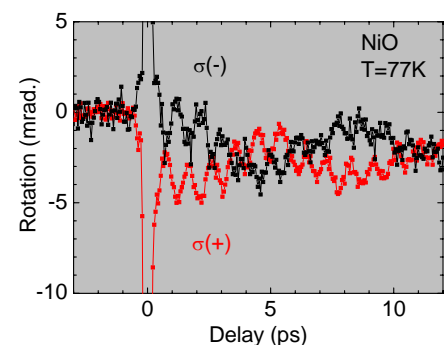
We investigate ultrafast coherent spin manipulation of magnetic materials by using femtosecond laser pulses and terahertz pulses. (Sub)terahertz spin precessions have been nonthermally induced by circularly polarized pulses. We also study imaging of spin wave propagation in ferrimagnets excited by optical pulses.



Spin dynamics in magnetic materials



Experimental setup with femtosecond laser pulses

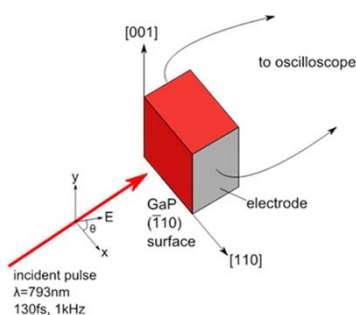


Terahertz spin precession in antiferromagnet

## Femtosecond nonlinear optics

Ultrafast photogalvanic current in noncentrosymmetric crystal

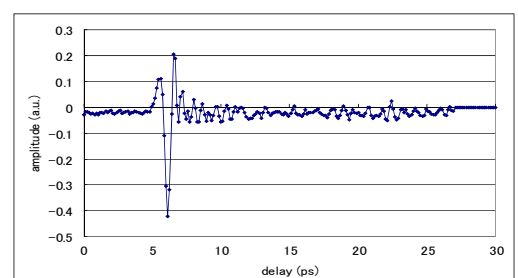
Ultrafast photogalvanic current generated by femtosecond laser pulses has been detected with an oscilloscope and terahertz time-domain spectroscopy. This phenomenon will be applied to an optical correlator.



Measurement of photogalvanic current



Experimental setup with femtosecond laser pulses



Time-domain photogalvanic current signal