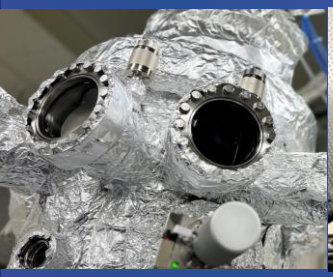
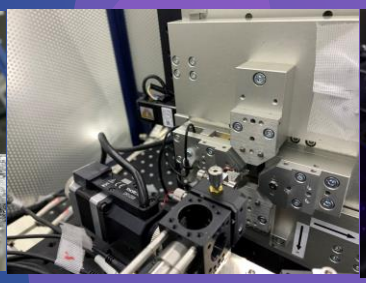
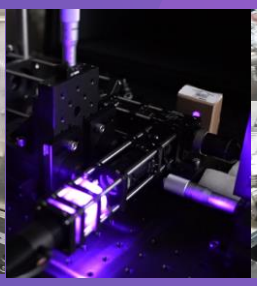
Chiba/Nomura Lab

Unleashing the Potential of Materials

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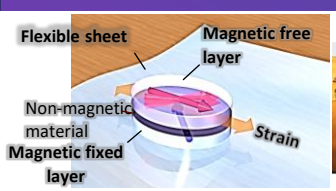
Materials are akin to air in that they fundamentally underpin human life. As scientists, we are tasked with contributing to humanity by creating a sustainable society and generating innovative material functions that overcome existing concepts. We take advantage of of various measurement methods and international collaborative research to explore new academic domains. While there are countless approaches, some of the main ones are outlined below:

1. Interatomic spacing is the most fundamental determinant of solid material properties. If one can reversibly induce significant interatomic spacing modulation, one can endow materials with novel properties and functions. We focus on the nanometer thin films that can be stretchable. Centering on magnetic properties, or spin properties, we advance the proposal of principles for controlling material properties, understanding and feedbacking of background science utilizing Nano-Terasu, which may lead to development of mechanical sensing technologies leading to societal implementation. Through these efforts, we will pioneer new academic domains of "spin-elastotronics" and ultimately "nano-elastotronics."

2. Whereas Nano-magnetic materials are used for information recording, we exploit their magnetic interactions to realize "intelligent nano-magnetic materials." For instance, we are developing devices without power capable of sensing forces, storing the information, and performing calculations.

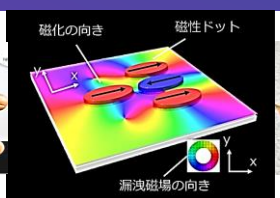
3. Through initiatives 1 and 2, we will dramatically expand the scope of societal implementation for spintronics, bringing about a game-changer in the field. Simultaneously, we will contribute to the advancement of measurement and control technologies. Vigorously promoting the integration of Nano-Terasu synchrotron radiation and other measurement methods, and the digital transformation of measurement as well as manipulation, we will explore new use cases.。

Strain vector sensing

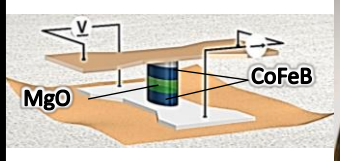


Vital motion sensing

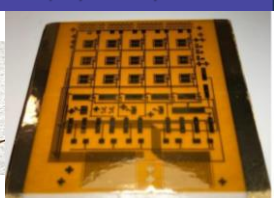
Magnetic logic gate



Film-type strain gauge with the world's highest sensitivity



Integrated spin cyber physical system



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