

When the amount of liquid in question is minute, it is a challenge to analyze its chemical and physical properties. The techniques based on Surface plasmon resonance are attractive for many reasons, but available experimental protocols rarely use polarization effects. Magneto-optic effects in nanocomposites such as colloids of metal nanoparticles, magnetic fluids, or solid nanocomposites are almost unexplored. However, there are many examples in arthropod world where animals successfully use magnetic nanoparticles for orientation. We study surface plasmon resonances and their effects on Faraday and Kerr rotations, magneto-diffraction and interference caused by magnetic nanorods, and use of magnetic nanorods in microrheological assay of biofluids.

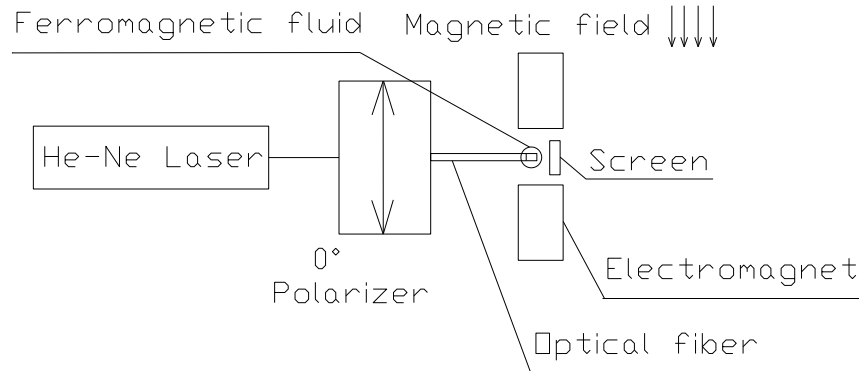
In summary, this research aims to investigate new magneto-optical effects in nanocomposites and develop a new class of fiber-based materials and devices capable of sensing or analyzing magnetic compounds or some other chemicals reacting on magnetic field.

❑ **Strategic goal:**
Development of magneto-optofluidics for biofluid probing and analysis

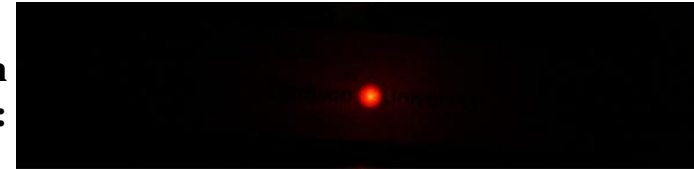
❑ **Current focus on:**
❑ Studying new magneto-optical effects in colloids

❑ Development of optofluidic devices for probe illumination

❑ **Applications:**
Micro and nanofluidics, biofluid analysis



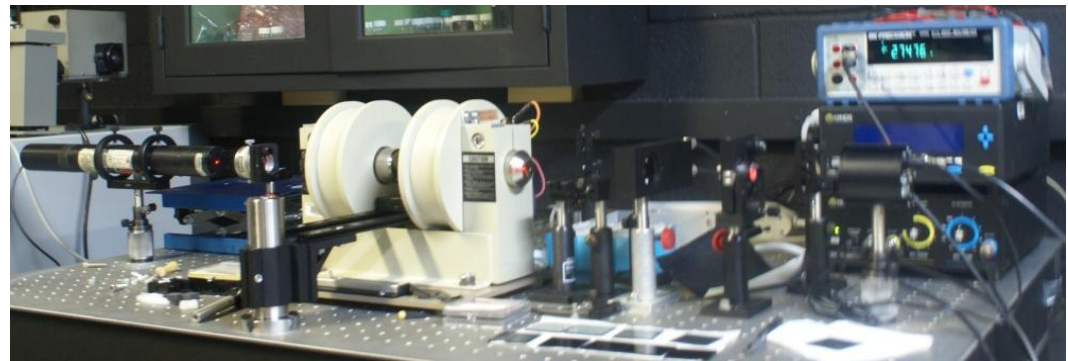
When the field is off, the light is seen on the screen as a circular spot:



When the field is on, the light is seen on the screen as an extended strip:



Set up for magneto-optic experiments:



Group members: Tokarev, Gu

❑ Strategic goal:

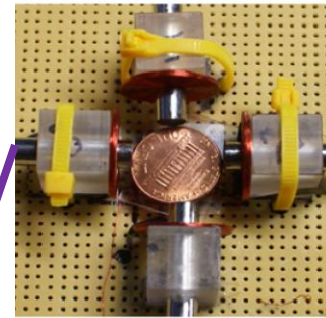
Development of magneto-optofluidics for biofluid probing and analysis

❑ Current focus on:

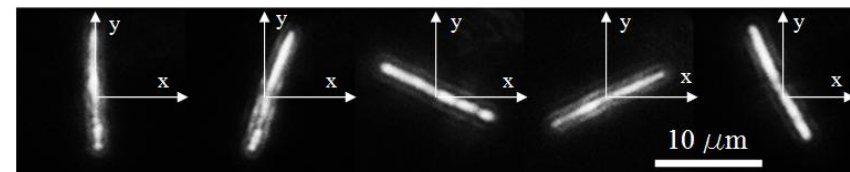
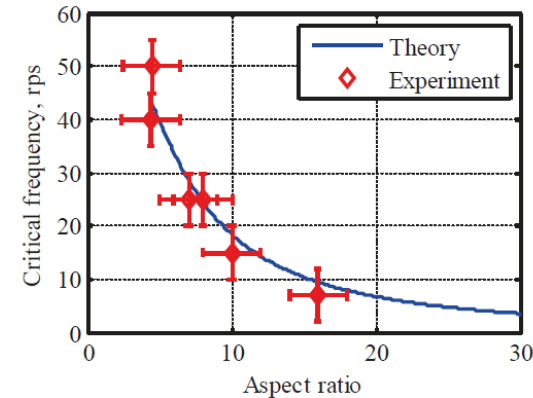
❑ Study of microrheology of tixotropic biopolymers with rotating magnetic nanowires

❑ Applications:

Micro and nanofluidics, biofluid analysis



Critical frequency f_c up to which rotation of nickel nanorod is synchronized with rotation of magnetic field as function of nanorod aspect ratio l/d .



Group members: Tokarev