Protective thin layers for thin films with spintronic applications

Vedoucí : RNDr. Eva Schmoranzerová, Ph.D. (eva.schm@karlov.mff.cuni.cz)
Katedra chemické fyziky a optiky MFF UK
Konzultant : Dr. Dominik Kriegner (kriegner@fzu.cz)
Fyzikání ústav AV ČR

Electricity consumption for computing is becoming a growing problem in today's world: Thus, one of the biggest challenges for solid state physics is to develop physical concepts and technologies to reduce this energy intensity. One possible approach is offered by so-called spintronics, a field that seeks to harness the spin of electrons to perform logical operations and store information. In spintronics the dissipative charge currents causing the increasing power consumption of microelectronics can be replaced by dissipation free spin currents. New materials for spintronics applications, which are often explored in the form of single crystalline thin films, often contain highly reactive elements and therefore suffer from degradation when exposed to ambient conditions.

A crucial role in the development of new materials for spintronics is therefore to identify suitable protective coatings which can prevent degradation of the active spintronics film when in contact with air. The students projects therefore would be to produce protective coatings on spintronics thin films by magnetron sputtering (see Figure) and study the protective effect by time dependent resistivity measurements. If desired, the project can be extended to the growth of the active spintronics thin film and its characterization. This project is proposed in collaboration with the Institute of Physics of the CAS. The experiments will be carried out in the Department of Spintronics and Nanoelectronics of the Institute of Physics of the CAS.

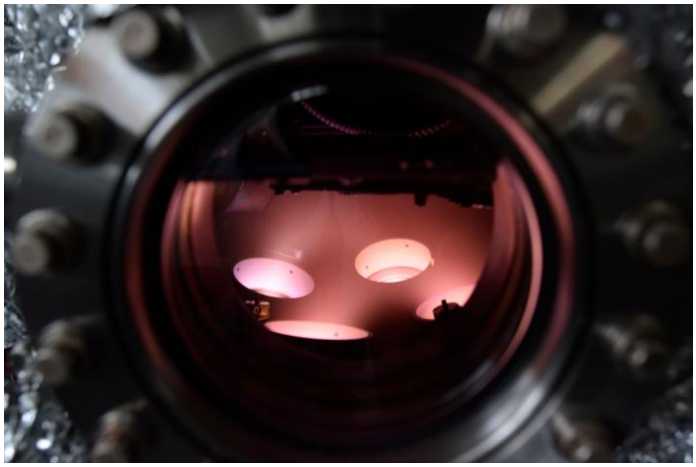

Figure 1: Magnetron sputtering system with ignited plasma for thin film deposition