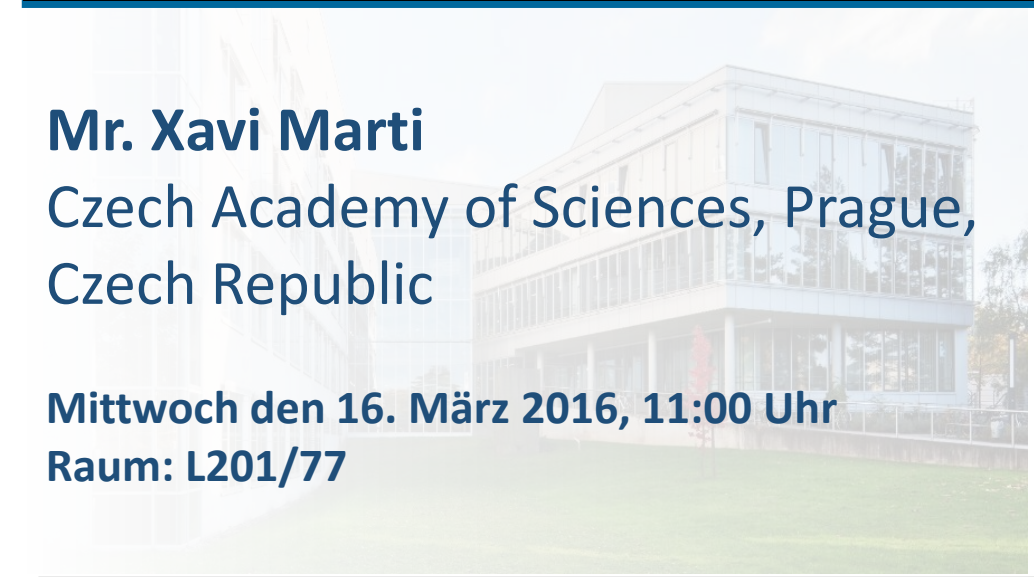
Fachvortrag

Spintronics from nano to geo: antiferromagnetic memories, parkings and volcanoes



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Raum: L201/77

Spintronics has changed the world. Yet many of us would confine its merits only to magnetic data storage. But *there is much more room up there*: spintronics lays behind many more –and bigger– aspects of our lives. For instance, many processes in automated assembly lines in industry relay on spintronics. And the beauty of it is that the principles that underpin the magnetic read-out in hard drives mimic the way in which one engineer would detect a tuna can before stopping it in order to fill it or label it.

In this talk, we will walk through fundamental advances in spintronics. We will start at the moment in which Lord Kelvin discovered the anisotropic magnetoresistance in 1856. We will accompany Louis Neel in his military service where he managed to render invisible the french navy from the nazi's magnetic mines. Later, we will visit automated assembly lines at the moment in which the integrated circuits started a revolution in miniaturization. We will review a few inventions related to spintronics that were already envisaged but impossible to realize in the late 70's. That will bring us to the deployment of anisotropic magnetoresistance, and later giant magnetoresistance, in the read-heads of hard-drives. Finally, we will discuss the role of spintronics in the *internet of things*, a massive deployment of inter-connected sensors. Spintronics delivers energy-efficient sensors and storage that will help us finding our nearest parking spot or fine tune the real estate prices through precise measurements of geodynamic activity. Did you know that the second cause of lung cancer in the US is radon contamination and this could be anticipated using a magnet and a compass? Would that affect your decision in buying your next home?

The Czech Academy of Sciences participates in a scientific mission in Canary Islands this May. A team of *magnetic nanoscientists* and geologists will use spin-orbit coupling to monitor the geodynamic activity of a volcanic island. How come 10 nm of permalloy will watch a volcano?

Read more at igsresearch.com/spintronics

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