



UNIVERSITATEA BABEȘ-BOLYAI

TRADIȚIE ȘI EXCELENȚĂ



FACULTATEA DE FIZICĂ

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**Prof.dr. Habil Coriolan TIUȘAN**

**Domenii de cercetare:**

**Spintronica si Nanomagnetism (RO)**

Acest domeniu este situat in aria de convergenta a fizicii sistemelor de dimensionalitate redusa, micro/nanotehnologiilor. Spintronica combina magnetismul si electronica conventionala urmarind manipularea simultana a spinului si sarcinii electronului in dispozitive pe baza de heterostructuri de filme subtiri complexe. Acestea se regasesc in aplicatii de ultima generatie de tip senzori, memorii magnetice nonvolatile, nano-oscilatori, retele neuronale artificiale... Prin activitati de ceretare fundamentala de avangarda se urmareste elaborarea si dezvoltarea fizicii aferente a unor materiale complexe inovative de dimensionalitate mezoscopica cu proprietati predefinite. Plecand de la acestea, prin tehnici micro si nanolitografice, se elaboreaza micro si nano-demonstratori ai unor componente electronice de generatie avansata. Cercetarile derulate implica tehnici specifice de elaborare si caracterizare structurala, morfologica, magnetica si electrica pentru sisteme mezoscopice de dimensionalitate variabila 3D, 2D, 1D (filme subtiri, suprafete, interfete, nanostructuri) completate prin activitati de modelare teoretica a structurii electronice si a proprietatilor magnetice si de transport.

Personal web page: <http://spin.utcluj.ro/webperso/welcome.html>

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### **Research interest**

#### **Spintronics and Nanomagnetism**

This domain belongs to the convergence area of low dimensional system Physics, micro and nanotechnologies. The Spintronics combines the magnetism and the conventional electronics and is based on the simultaneous manipulation of the electron's spin and charge in complex thin-film heterostructures. It has major applications in frontier technologies of sensors, nonvolatile magnetic memories, nano-oscillators, artificial neural networks, etc. Following upstream research activities we aim to elaborate and develop the adjacent Physics of innovative complex materials at mesoscopic scale with tailored functional properties. Then, in a next step, micro and nano-demonstrators of advanced electronic components are being developed using micro and nano-lithographic techniques. The research carried out involves specific techniques for structural, morphological, magnetic and electrical characterization for 3D, 2D, 1D (thin films, surfaces, interfaces, nanostructures) mesoscopic systems. Experimental researches are complemented by the theoretical modeling of the electronic structure, magnetic and transport properties of mesoscopic systems and spintronic devices.

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