Our aim is to provide a theoretical framework for studies of dynamical aspects of magnetic materials and magnetisation reversal, which has potential for applications for magnetic data storage and magnetic memory devices. The project focuses on developing and using an atomistic spin dynamics simulation method. Our goal is to identify novel materials and device geometries with improved performance. The scientific questions which will be addressed concern the understanding of the fundamental temporal limit of magnetisation switching and reversal, and the mechanisms which govern this limit. The methodological developments concern the ability to, from first principles theory, calculate the interatomic exchange parameters of materials in general, in particular for correlated electron materials, via the use of dynamical mean-field theory. The theoretical development also involves an atomistic spin dynamics simulation method, which once it has been established, will be released as a public software package. The proposed theoretical research will be intimately connected to world-leading experimental efforts, especially in Europe where a leading activity in experimental studies of magnetisation dynamics has been established. The ambition with this project is to become world-leading in the theory of simulating spin-dynamics phenomena, and to promote education and training of young researchers. To achieve our goals we will build up an open and lively environment, where the advances in the theoretical knowledge of spin-dynamics phenomena will be used to address important questions in information technology. In this environment the next generation research leaders will be fostered and trained, thus ensuring that the society of tomorrow is equipped with the scientific competence to tackle the challenges of our future.
**Campo scientifico**

/natural sciences/mathematics/pure mathematics/geometry

/scienze naturali/informatica e scienze dell'informazione/software

**Programma(i)**

FP7-IDEAS-ERC - Specific programme: "Ideas" implementing the Seventh Framework Programme of the European Community for research, technological development and demonstration activities (2007 to 2013)

**Argomento(i)**

ERC-AG-PE3 - ERC Advanced Grant - Condensed matter physics

**Invito a presentare proposte**

ERC-2009-AdG

Vedi altri progetti per questo bando

**Meccanismo di finanziamento**

ERC-AG - ERC Advanced Grant

**Ricercatore principale**

Olof Ragnar Eriksson (Prof.)

**Istituzione ospitante**

UPPSALA UNIVERSITET

Indirizzo

Von Kraemers Alle 4
751 05 Uppsala
Svezia

Typo di attività

Higher or Secondary Education Establishments

Contributo UE

€ 2 130 000

**Sito web**

Contatta l'organizzazione

Ricercatore principale

Olof Ragnar Eriksson (Prof.)

Contatto amministrativo

Göran Possnert (Prof.)

**Beneficiari** (1)
UPPSALA UNIVERSITET
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