COLLOQUE DE PHYSIQUE EPFL

EPFL PHYSICS COLLOQUIUM

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Room CM2

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Magnetic skyrmions in ultrathin films

As an introduction, the ideas of T.H.R. Skyrme to describe particles by topologically stable field configurations, later extended to the topological description of defects and structures of the order parameter in condensed matter, will be described.
Then, the role of an anti-symmetric magnetic exchange term, called the Dzyaloshinskii-Moriya interaction (DMI), to stabilize such magnetic structures will be discussed. This interaction was recently discovered to be induced at certain interfaces of magnetic materials. Interfacial DMI enforces a given chirality of skyrmions. The peculiar dynamics of magnetic skyrmions, resulting from their topology and chirality, will be then presented, according to theory and as observed in several recent experiments. The size and thermal stability of skyrmions will also be discussed. Finally, the applications of skyrmions as envisioned presently will be described.

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