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## [242] Controlling skyrmion density and formation mechanism by tuning ferromagnetic layer thicknesses in thin film multilayers

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With the goal of controlling the skyrmion density and their formation mechanism, which are highly relevant for spintronic devices using skyrmions, we investigate  $[Ir(1nm)/Co(t)/Pt(1nm)]_n$  multilayers with varying Co-layer thickness. We observe that by increasing the Co layer thickness, domains (at zero field) become narrower, and skyrmion density (in an applied field) increases. This can be explained using the critical material parameter  $= D/4\sqrt{AK_{eff}}$ , with *D*-interfacial DMI constant, *A*-exchange stiffness and  $K_{eff}$ -effective magnetic anisotropy. Skyrmions are thermodynamically stable for  $\kappa > 1$ . Here,  $\kappa$  increases as the effective anisotropy approaches zero at a critical Co-thickness. Furthermore, two different skyrmion formation mechanisms (shrinking and fission) are observed.

## **Theoretical Work**

**Author:** Ms PEREMADATHIL PRADEEP, Reshma (Empa, Swiss Federal Laboratories for Materials Science and Technology)

**Co-authors:** Dr MANDRU, Andrada-Oana (Empa, Swiss Federal Laboratories for Materials Science and Technology); Prof. HUG, Hans Josef (Empa, Swiss Federal Laboratories for Materials Science and Technology; Department of Physics, University of Basel)

**Presenter:** Ms PEREMADATHIL PRADEEP, Reshma (Empa, Swiss Federal Laboratories for Materials Science and Technology)

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