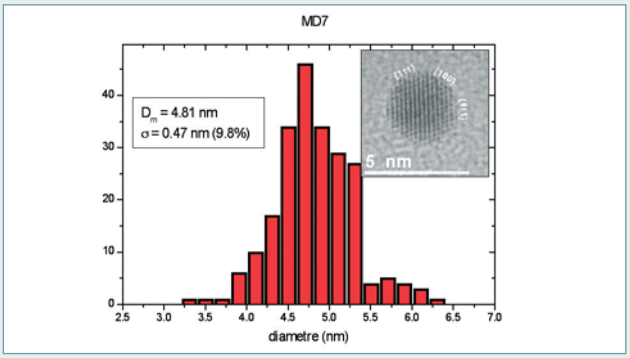
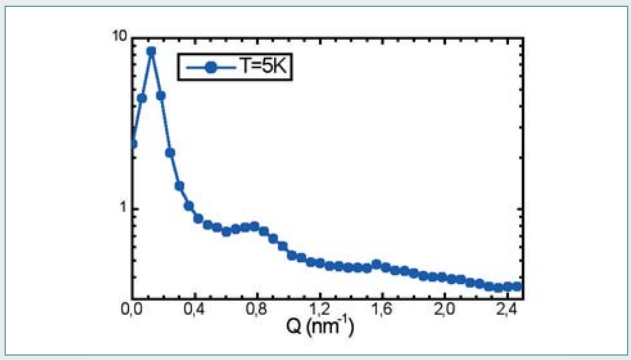
[*C9.* M. Delalande] Polarized SANS studies of FePt Magnetic Nanoparticles

Small angle neutron scattering with polarized neutrons (SANSPOL) has been performed on films of FePt nanoparticles prepared by first diluting the powder in deuterated toluene (0.1% volume concentration) then drying it out. Magnetization measurements show a superparamagnetic behavior below 25 K. The saturated magnetization is 290 emu/cm^3, about 25% of the value for bulk FePt. The particle size distribution is centered around 4.8 nm (left frame) with a 10% dispersion. SANSPOL data taken at T = 5 K in an applied field of H = 2.1 T (right frame) exhibit a peak at around 0.8 nm^{-1} indicative of an inter-particle distance of about 8 nm. This is in agreement with a picture of particles of diameter 5 nm linked by organic molecules of length 3 nm. As the temperature is increased a slight shortening of the inter-particles distance is observed.

[Collaboration: M. Delalande, A. Marty (DRFMC, CEA Grenoble); G. Chaboussant, S. Gautrot (LLB)]



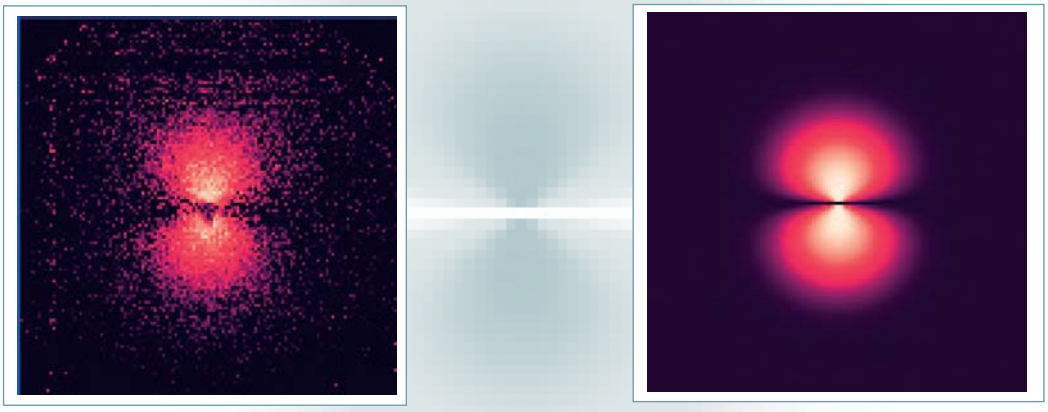


(left): Size distribution and TEM image of 5nm FePt particles. **(right):** SANSPOL data ($\Delta I = I^+ - I^-$) of FePt particles at 5 K in a field of 2.1 T. The inset shows the2D SANS signal; the ring structure reveals a magnetic contribution at $Q \approx 0.8$ nm^{-1}.

[*C10.* G. Viau] Small Angle polarised neutrons studies of dispersed magnetic Co-Ni nanowires

Small angle neutron scattering with neutron polarisation (SANSPOL) has been performed on dispersed magnetic nanowires presenting a wide range of sizes and shapes. The length range from 40 to 500 nm and the diameter is usually comprised between 5 and 20 nm. The metallic nanowires are embedded in a polymer matrix (PMMA or polystyrene) with the objective of achieving isolated individual nanowires, which can be structurally oriented in an applied field during the polymerization process. The longer-term motivation is to study not only the static magnetic properties like the magnetization vector inside the wires, but also to investigate the dynamical properties of these quasi-1D systems. SANSPOL experiments on two types of nanowires (long ones and bulky ones) have been performed at room temperature and under a magnetic field (0.5 T) strong enough to align the wire magnetization. A clear magnetic contribution, evidenced by a net difference between *up* and *down* polarisation signals (see figure) is observed. The results are in agreement with a uniform magnetization inside the wires.

[Collaboration: G. Viau, ITODYS Jussieu), T. Maurer, G. Chaboussant, F. Ott, S. Gautrot, LLB]



(left): Experimental SANSPOL data ($\Delta I = I^+ - I^-$) of "bulky" nanowires (12 nm diameter and 40 nm length).
(right): Simulation of the magnetic contribution using a uniform magnetic form factor.