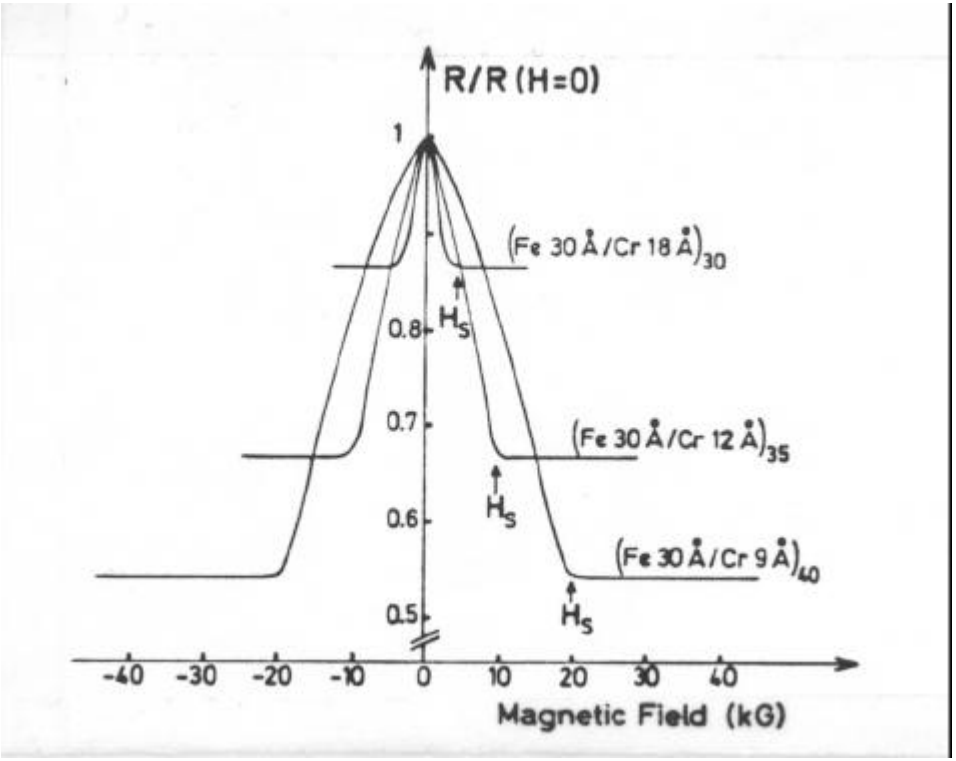
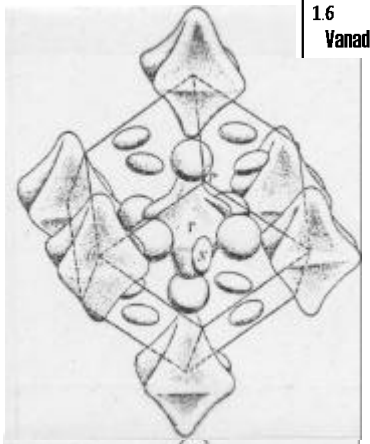
Fe/Cr superlattices / GMR

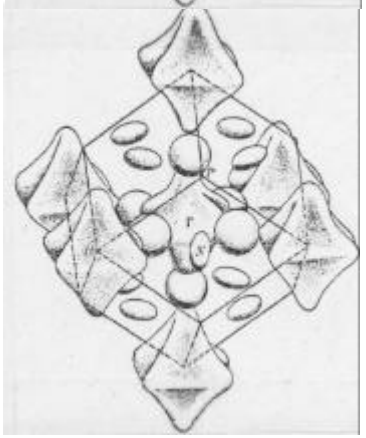


M.N. Baibich et al., PRL 61, 2472 (1988)

Fe/Cr superlattices / GMR

5 VB	6 VIB	7 VIIB	8	9 VIII
V 23	**Cr 24**	**Mn 25**	**Fe 26**	**Co 27**
50.9415	51.9961	54.93805	55.847	58.9332
1.6 5+	1.6 3+	1.5 2+	1.8 3+	1.8 2+
Vanadium	Chromium	Manganese	Iron	Cobalt





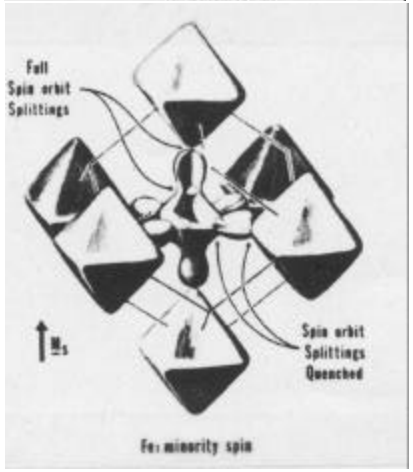
majority

$12e^-$ $14e^-$

$2\mu_B$

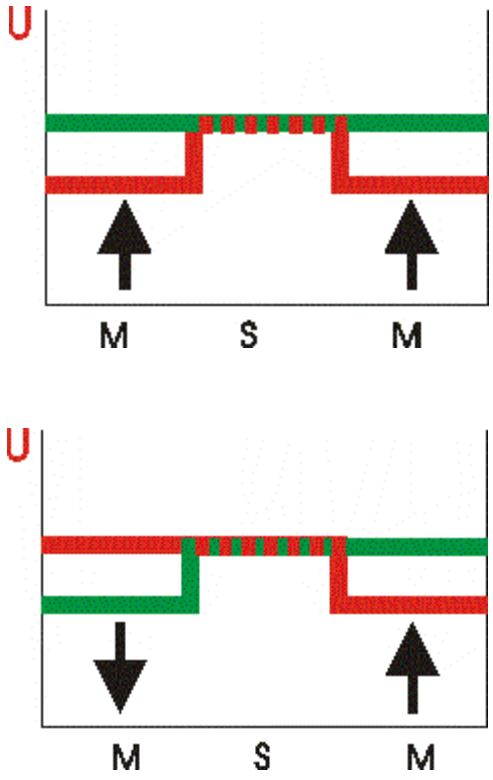
minority

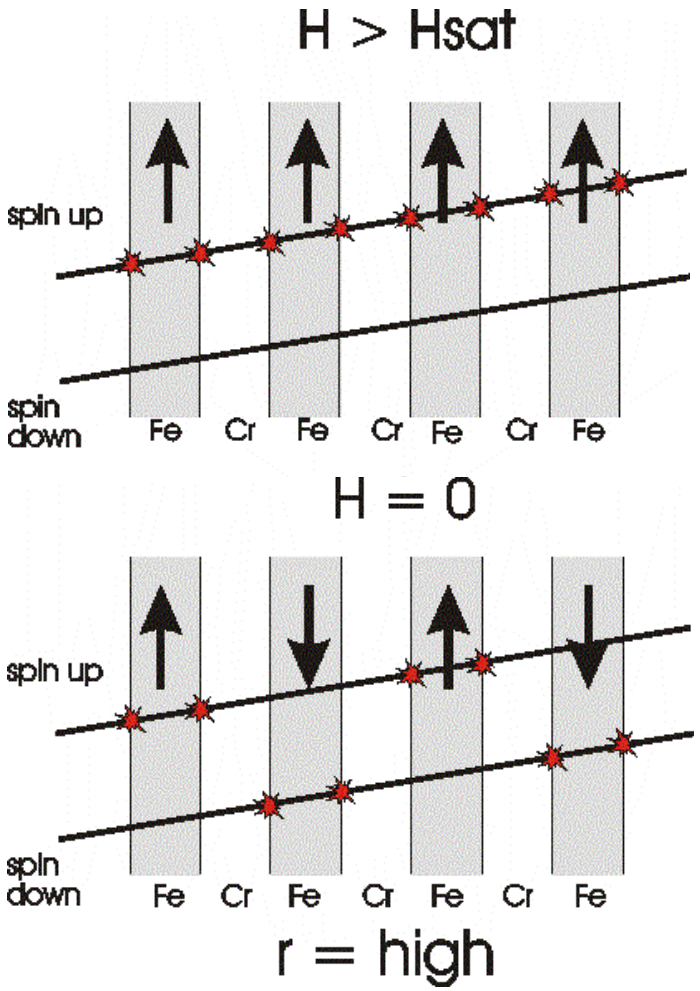
$12e^-$ $12e^-$



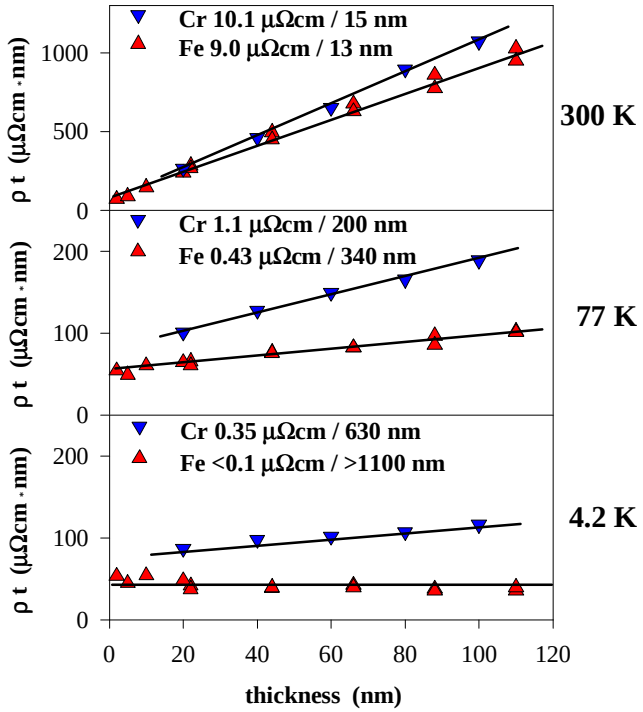
Ferromagnetic materials, E.P. Wohlfarth, Noth-Holland, Amsterdam (1980)
The Fermi Surfaces, A.P. Crackwell, K.C. Wong, Clarendon Press, Oxford (1973)

Fe/Cr superlattices / GMR





Epitaxial Fe/Cr layers on MgO(001)
thickness dependence of resistivity

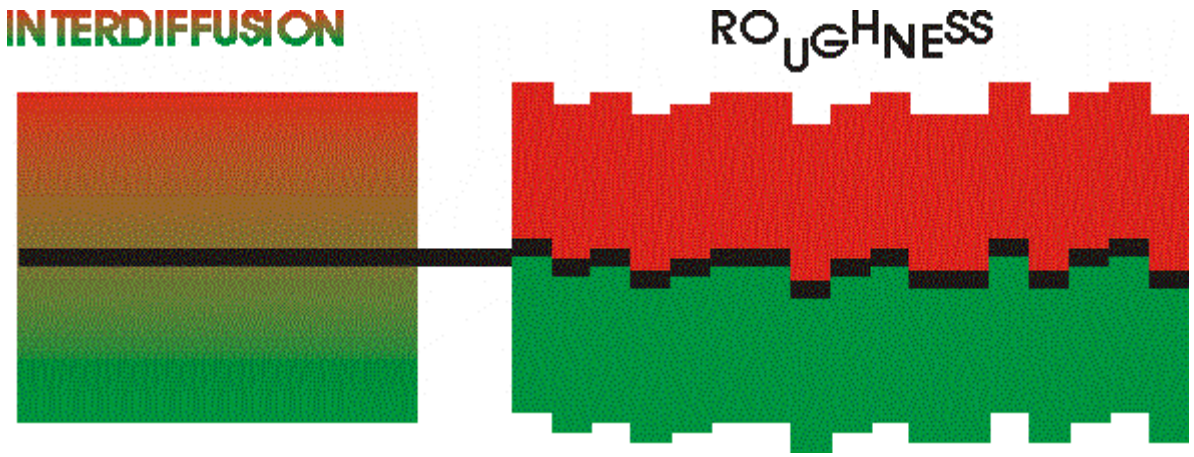


Negligible bulk defect density =>

only interface scattering

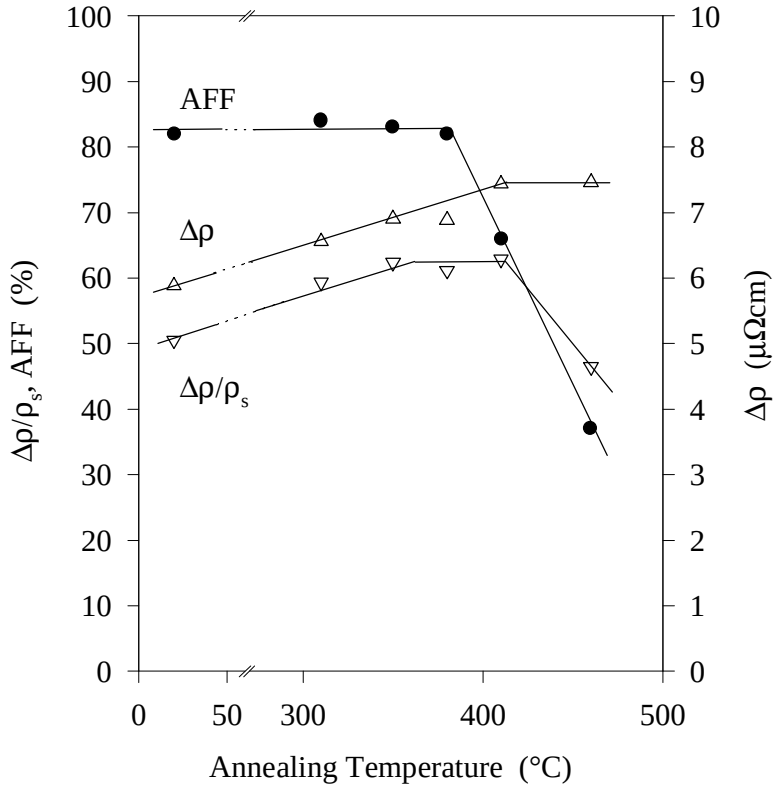
R. Schad, P. Beliën, G. Verbanck, V.V. Moshchalkov, Y. Bruynseraede
J. Phys. Condensed Matter 10, 6643 (1998)

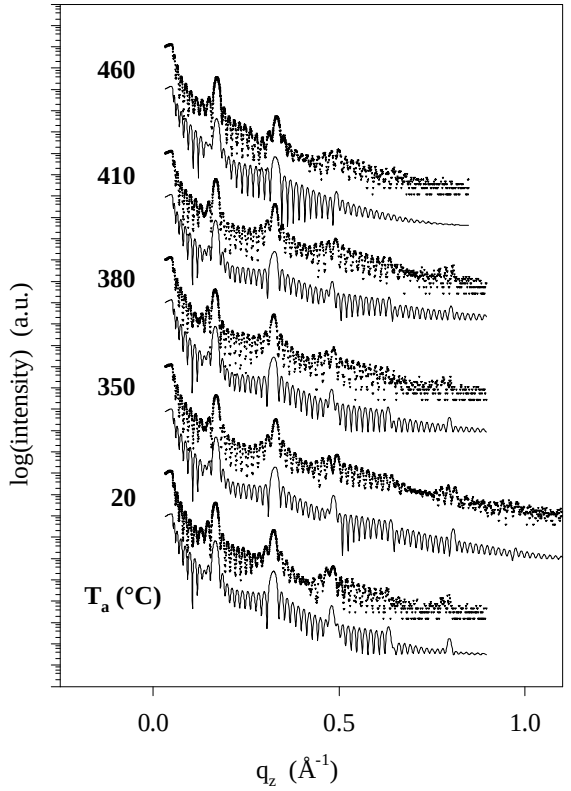
INTERFACE ROUGHNESS



can be described by its amplitude and the lateral length scale

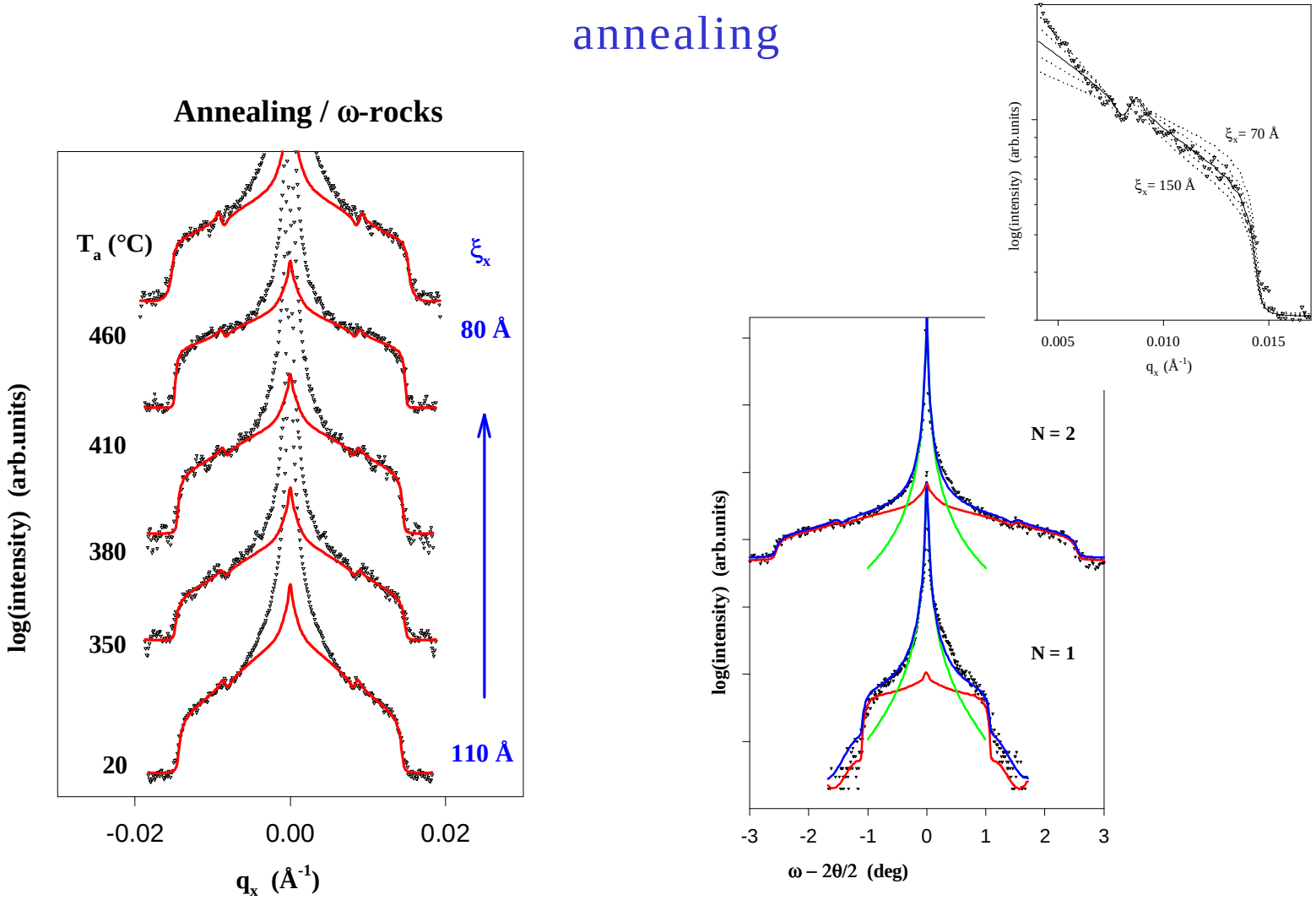
Epitaxial Fe/Cr superlattices on MgO(001) annealing





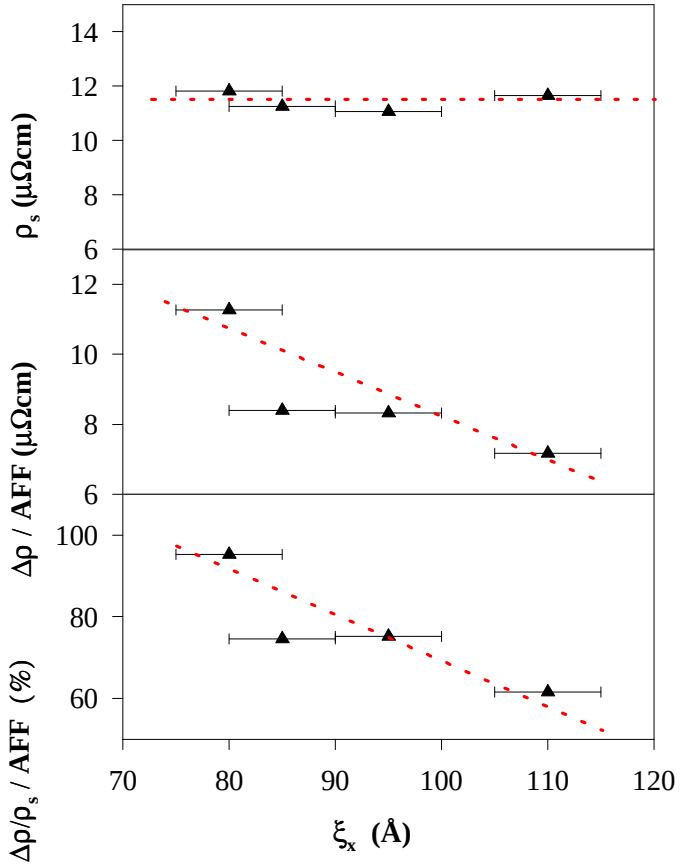
Phys. Rev. B 59, 1242 (1999)

Epitaxial Fe/Cr superlattices on MgO(001) annealing



Phys. Rev. B 59, 1242 (1999)

Epitaxial Fe/Cr superlattices on MgO(001)

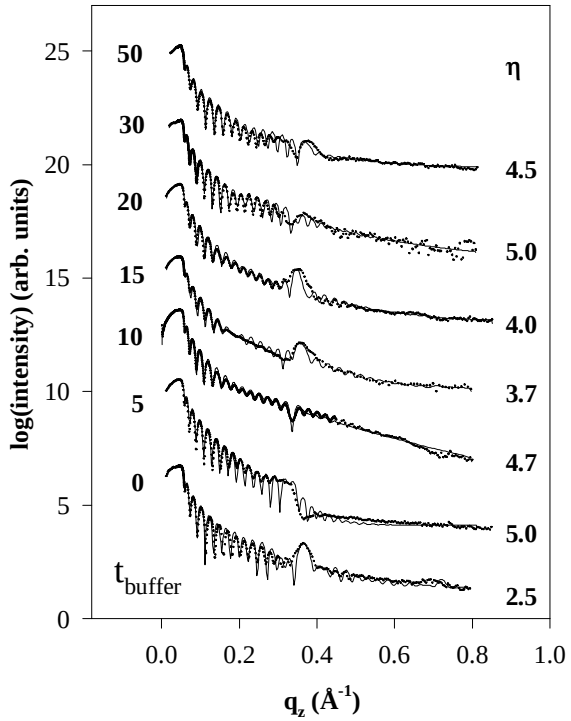


ρ_s is constant
[no interface scattering at saturation]

GMR is reduced with longer ξ

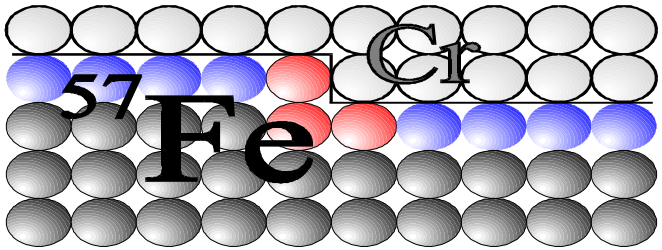
Phys. Rev. B 59, 1242 (1999)

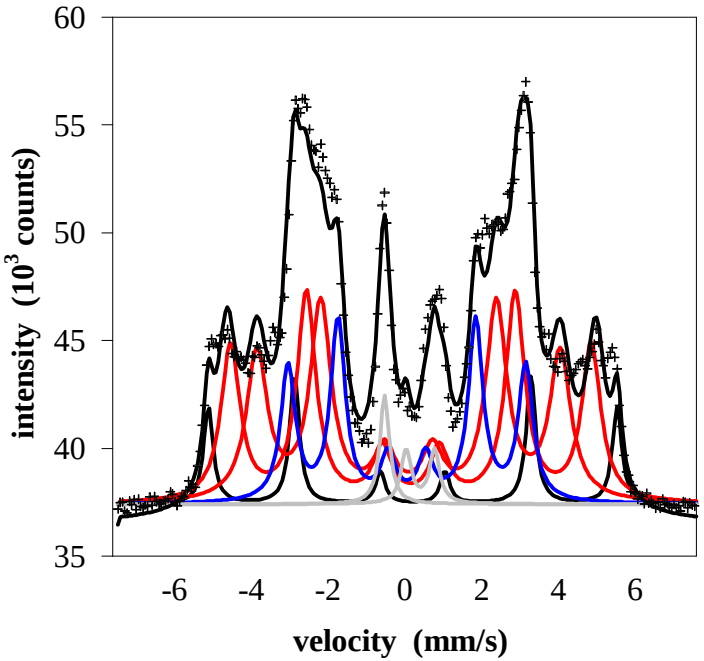
Epitaxial Fe/Cr superlattices on MgO(001)
Cr buffer layer

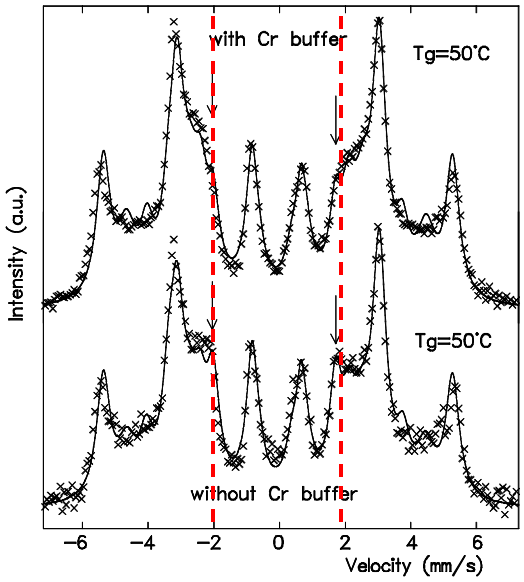


Europhys. Lett. 44, 379 (1998)

Epitaxial Fe/Cr superlattices on MgO(001)
Cr buffer layer - Mößbauer Spectroscopy

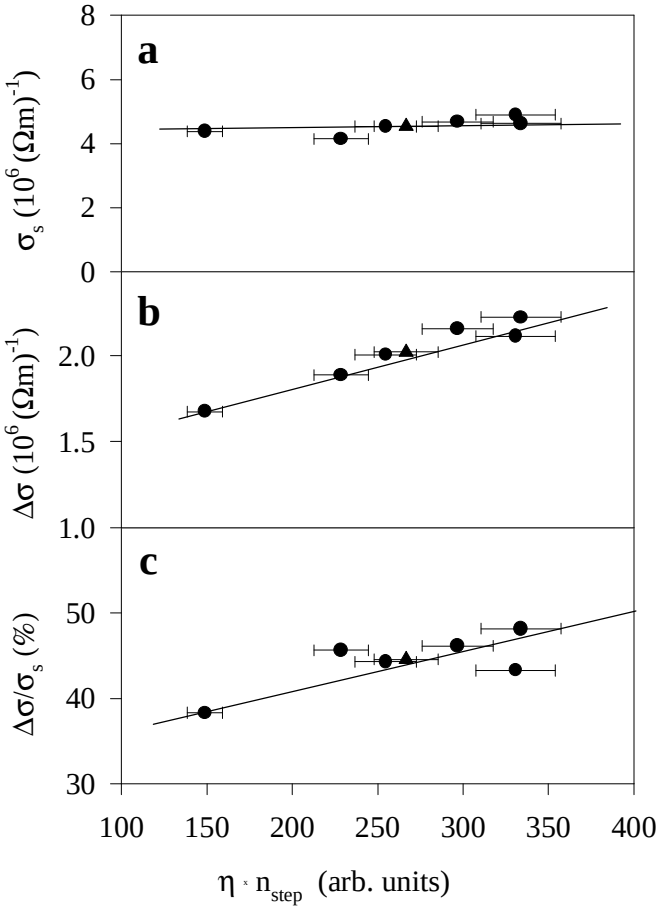






Europhys. Lett. 44, 379 (1998)

Epitaxial Fe/Cr superlattices on MgO(001)
Cr buffer layer

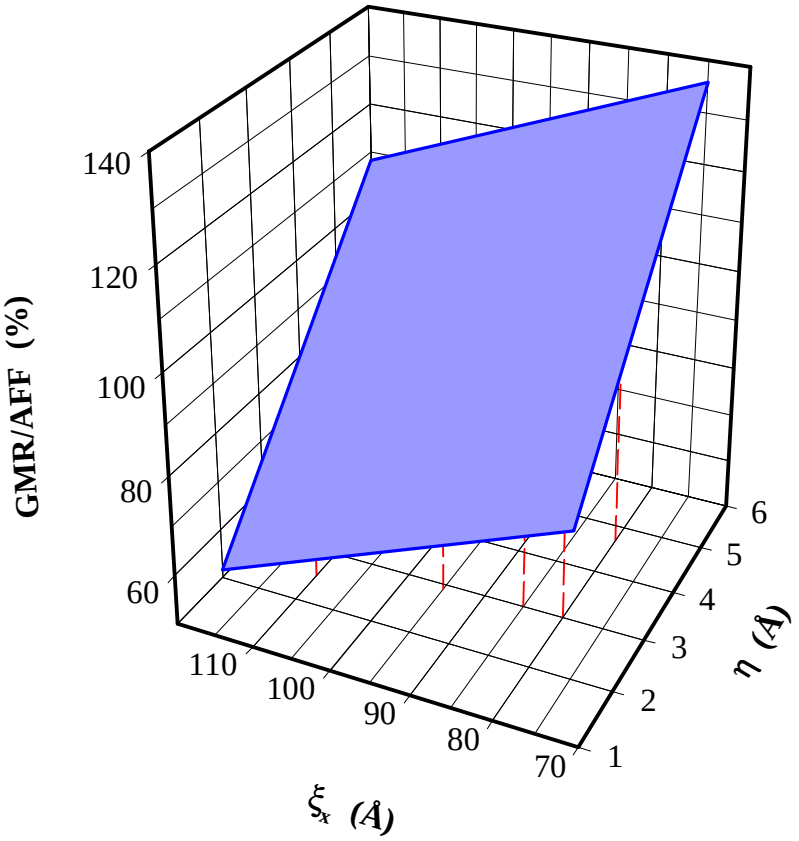


ρ_s is constant
[no interface scattering at saturation]

GMR is increased with increasing roughness amplitude and step density

Europhys. Lett. 44, 379 (1998)

Epitaxial Fe/Cr superlattices on MgO(001)
GMR

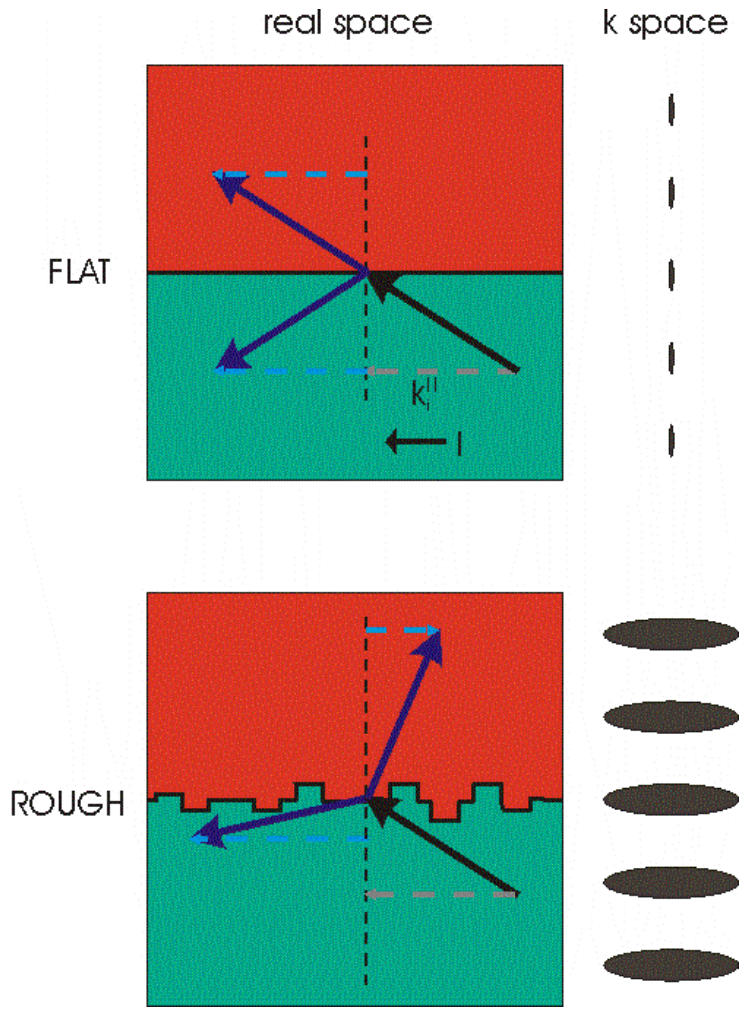


GMR is increased with

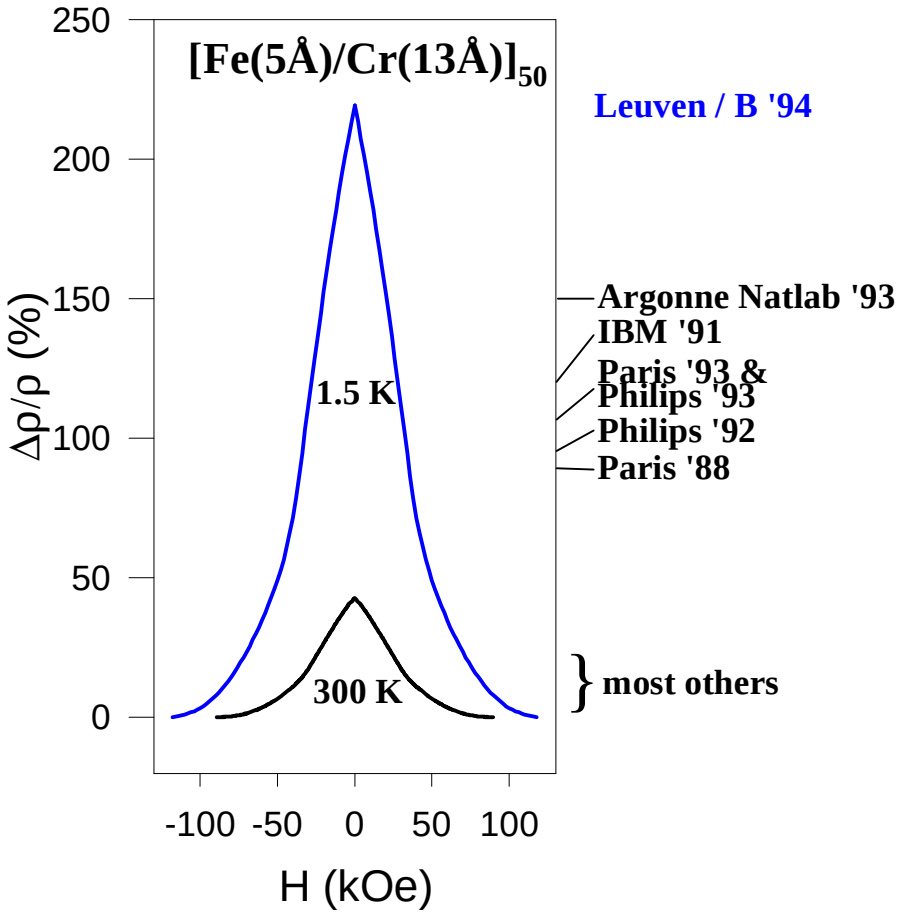
increasing roughness amplitude and

decreasing lateral correlation length

Epitaxial Fe/Cr superlattices on MgO(001)

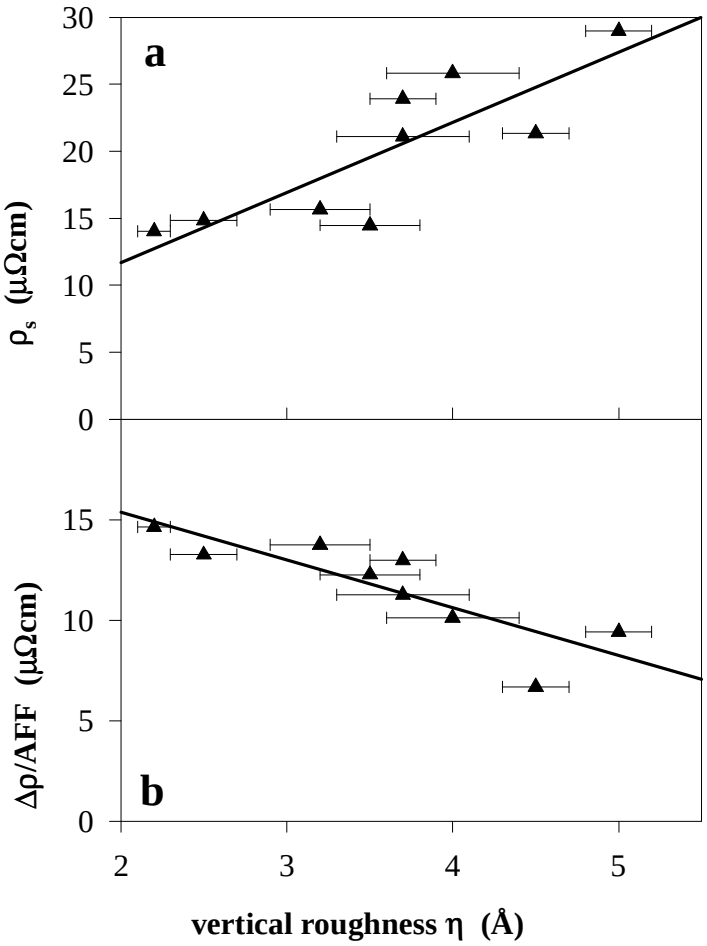


Epitaxial Fe/Cr superlattices on MgO(001)



R. Schad et al. APL 64, 3500 (1994)

Polycrystalline Fe/Cr superlattices on YSZ
GMR



GMR *dependence on interface roughness*

is reversed for polycrystalline samples

=> importance of bulk scattering