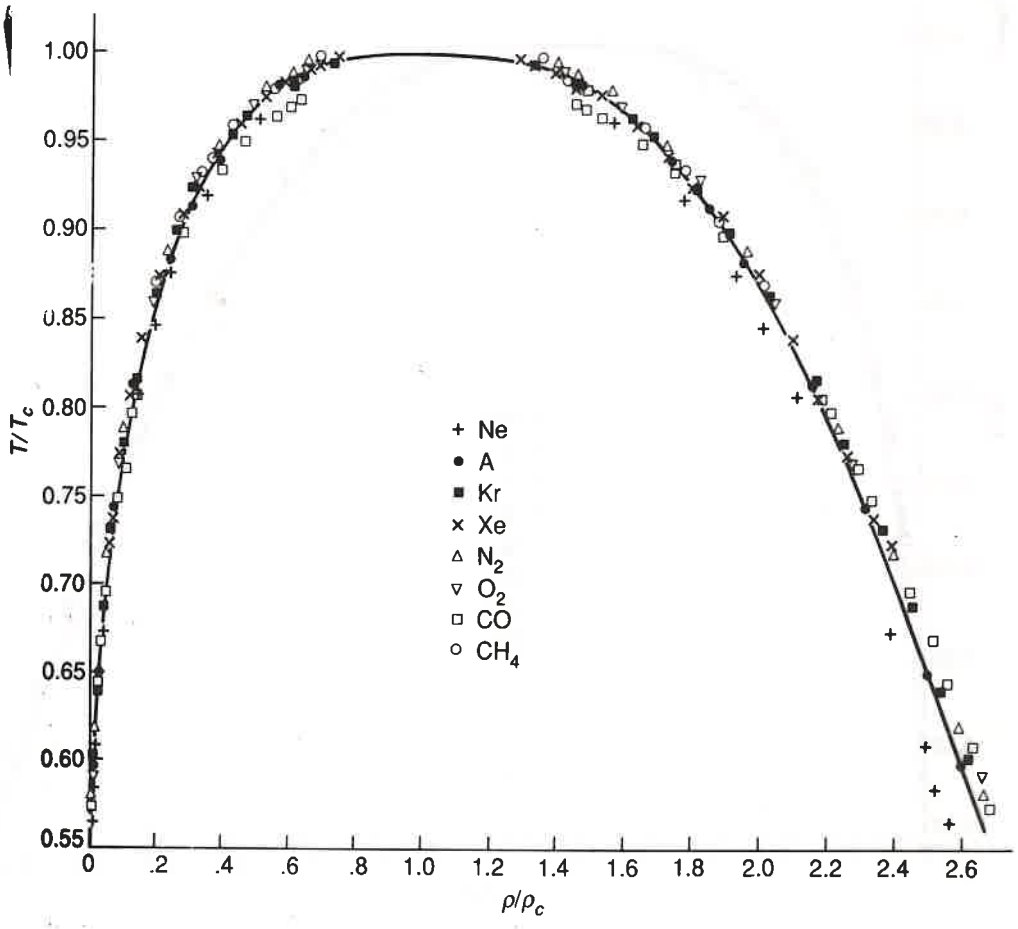
Universalität

Table 1.2. Values of critical exponents

	Xe	Binary fluid	β-brass	^{4}He	Fe	Ni
D	1	1	1	2	3	3
α	< 0.2	$0.113 \pm .005$	$0.05 \pm .06$	$-0.014 \pm .016$	$-0.03 \pm .12$	$0.04 \pm .12$
β	$0.35 \pm .015$	$0.322 \pm .002$	$0.305 \pm .005$	$0.34 \pm .01$	$0.37 \pm .01$	$0.358 \pm .003$
γ	$1.3^{+.1}_{-.2}$	$1.239 \pm .002$	$1.25 \pm .02$	$1.33 \pm .03$	$1.33 \pm .015$	$1.33 \pm .02$
δ	$4.2^{+.6}_{-.3}$	$4.85 \pm .03$		$3.95 \pm .15$	$4.3 \pm .1$	$4.29 \pm .05$
η	$0.1 \pm .1$	$0.017 \pm .015$	$0.08 \pm .07$	$0.021 \pm .05$	$0.07 \pm .04$	$.041 \pm .01$
ν	≈ 0.57	$0.625 \pm .006$	$0.65 \pm .02$	$.672 \pm .001$	$0.69 \pm .02$	$0.64 \pm .1$

Skalierte Koex. Kurven $\frac{T}{T_c}\left(\frac{\rho}{\rho_c}\right)$ für 8 Flüss./Gase



Beispiel:
P.Hs-Modell

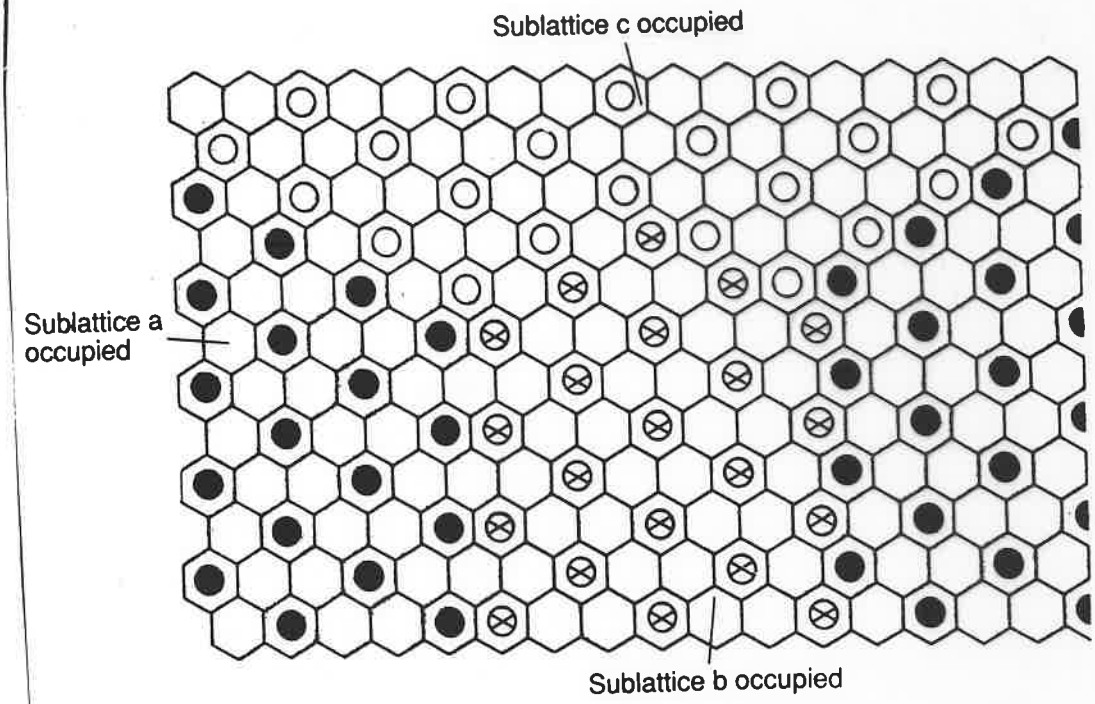


Fig. 3.6. Krypton adsorbed on the basal plane of graphite showing coexisting regions of the three ground states. After Kardar, M. and Berker, A. N. (1982). *Physical Review Letters*, **48**, 1552.

Kritische Exponenten!

Table 3.1. Universality classes

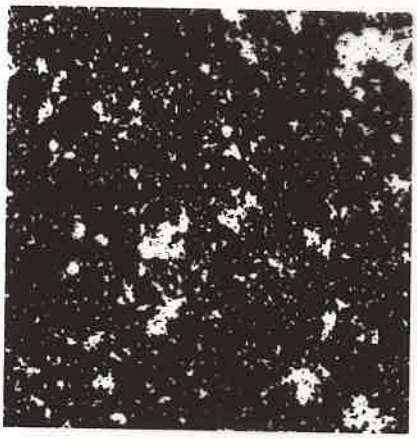
Universality class	Symmetry of order parameter	α	β	γ	δ	ν	η	Physical examples
2-d Ising	2-component scalar	0 (log)	1/8	7/4	15	1	1/4	some adsorbed mono e.g. H on Fe
3-d Ising	2-component scalar	0.10	0.33	1.24	4.8	0.63	0.04	phase separation, flu order-disorder e.g. β
3-d X-Y	2-dimensional vector	0.01	0.34	1.30	4.8	0.66	0.04	superfluids, supercon
3-d Heisenberg	3-dimensional vector	−0.12	0.36	1.39	4.8	0.71	0.04	isotropic magnets
mean-field		0 (dis.)	1/2	1	3	1/2	0	
2-d Potts, q=3	q-component scalar	1/3	1/9	13/9	14	5/6	4/15	some adsorbed mono
q=4		2/3	1/12	7/6	15	2/3	1/4	e.g. Kr on graphite

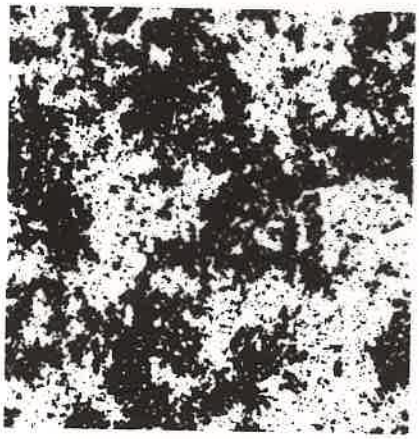
2 dim Ising

~~2 - dim. Ising - Modell~~

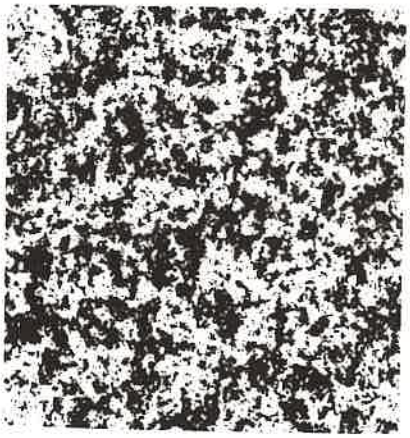
(512 x 512)

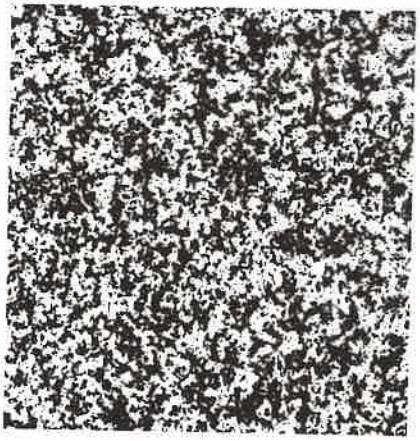
$T \approx 0.92\, T_c$





$T = T_c$

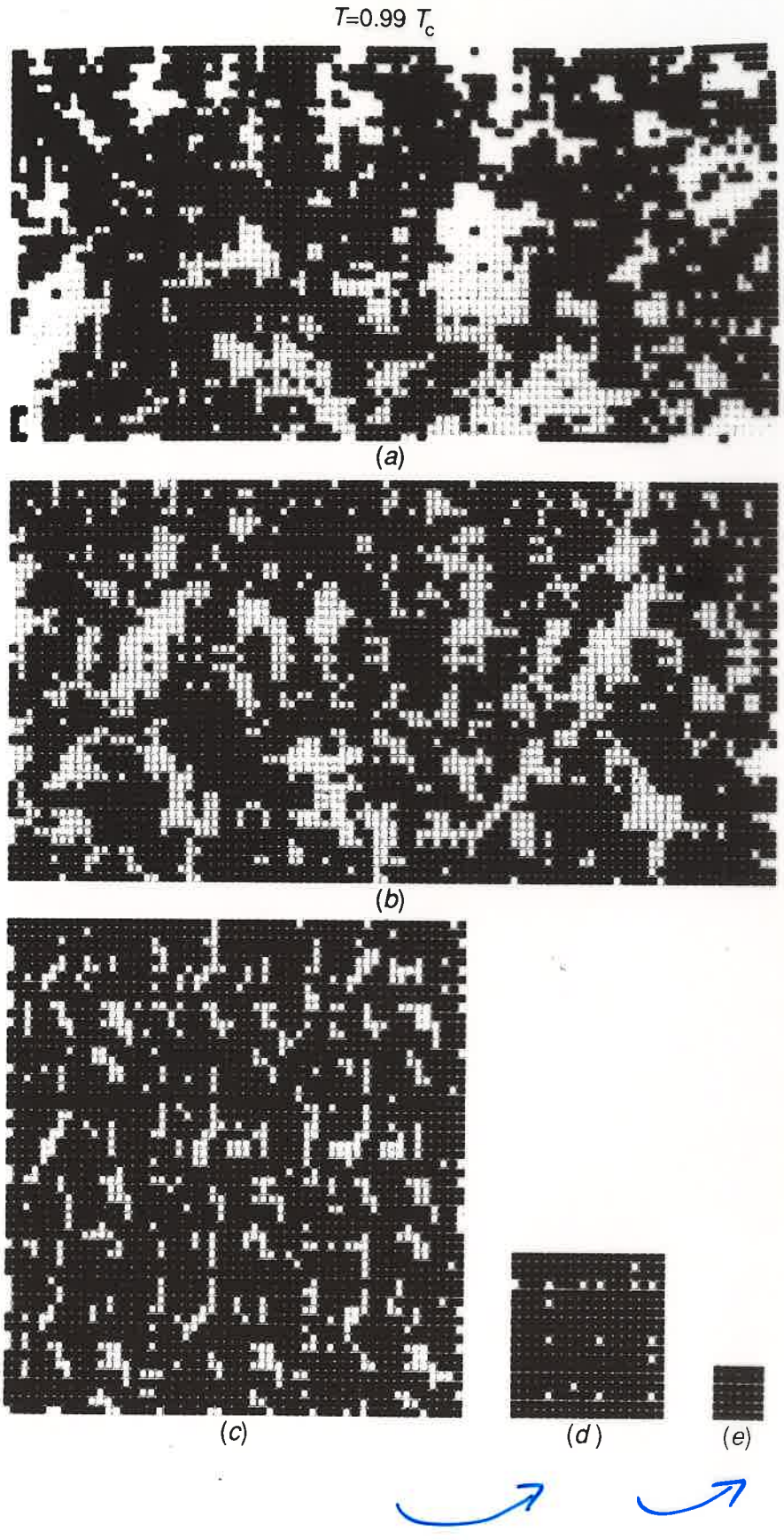




$T = 1.15\, T_c$

RG - Transf.

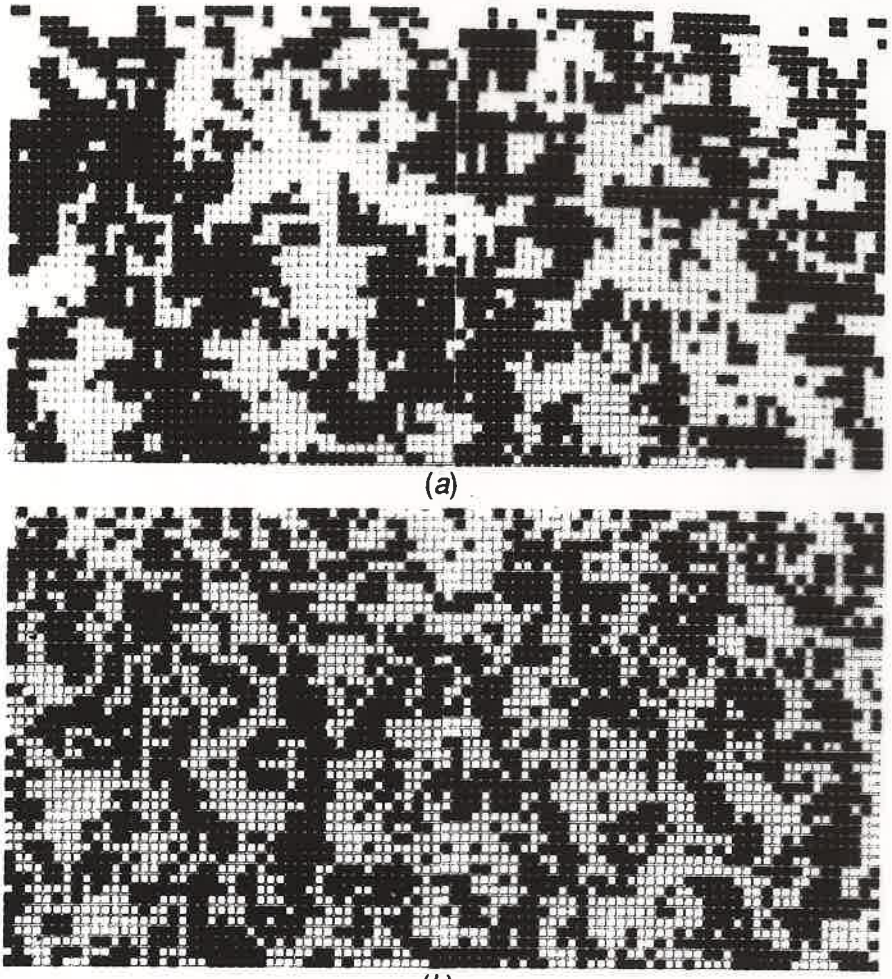
$T = 0.99\, T_c$



: wie $T = 0$

RG - Transf.

$T=1.22\ T_c$



$T=1.22\ T_c$

block

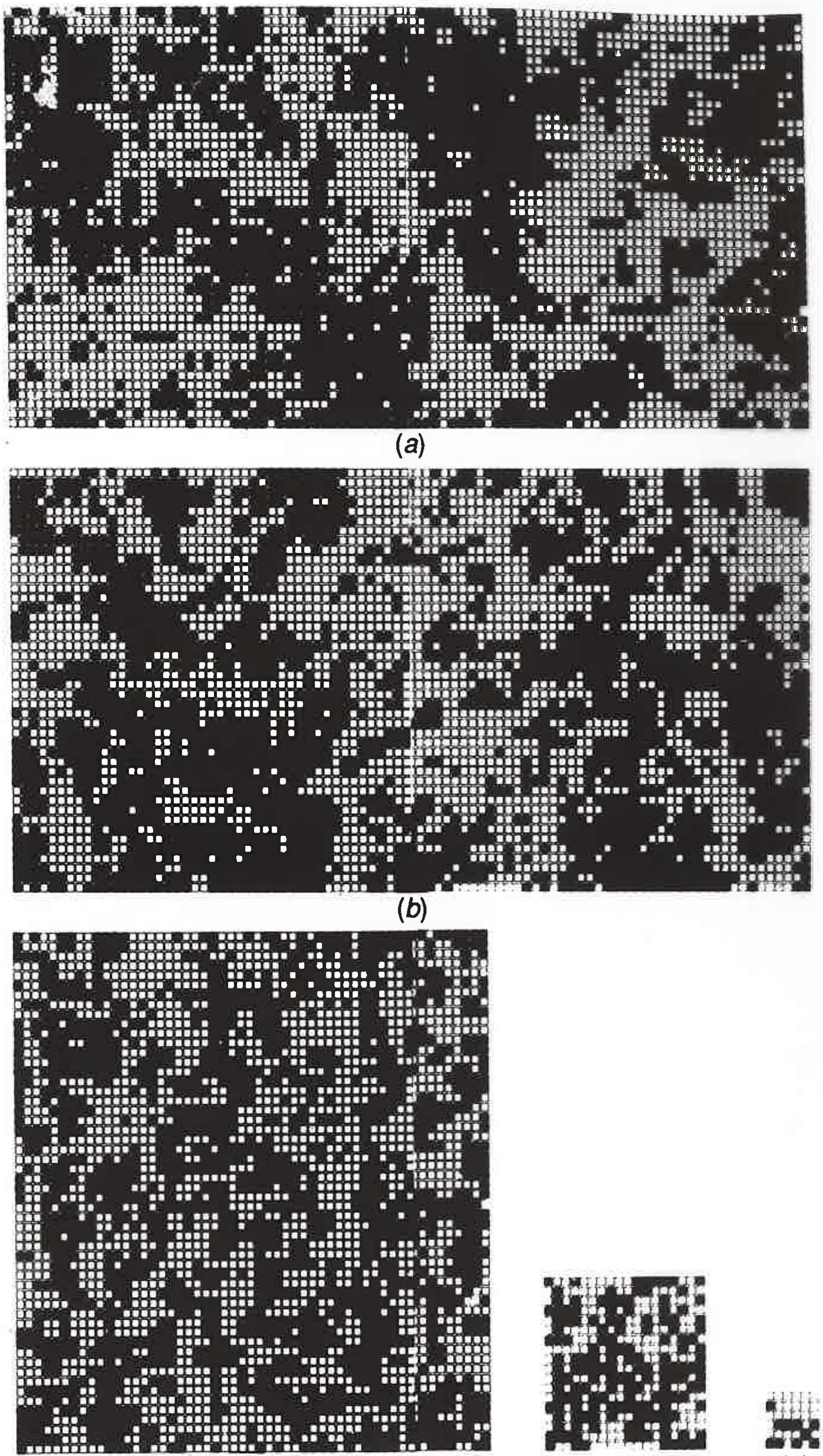
: white

$T=\infty$

RG - Transf.

$T \approx T_c$

$T = T_c$



(a) (b) (c) (d) (e)

block

wie $T \approx T_c$!