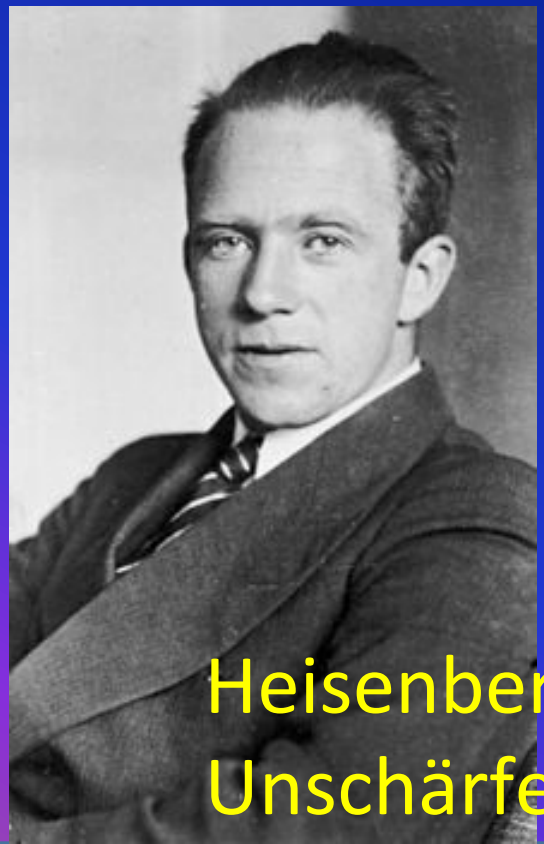
# DAS EPR-PARADOXON

260104 SE Quantenphysik ohne Formeln
Sommersemester 2011

Referat von Natalie Romanov

Vortrag gehalten im Rahmen der
L2 Vorlesung von Prof. R.A. Bertlmann
Dezember 2011

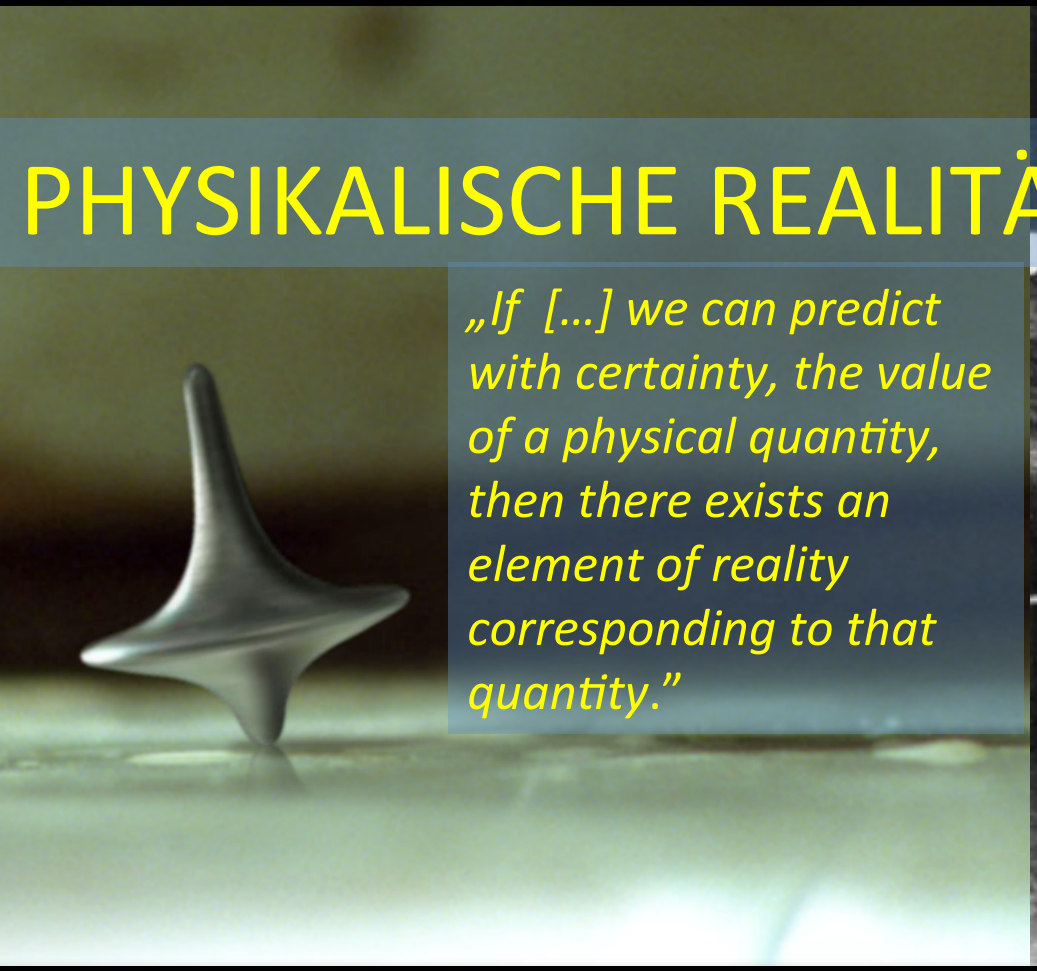
# KOPENHAGENER DEUTUNG



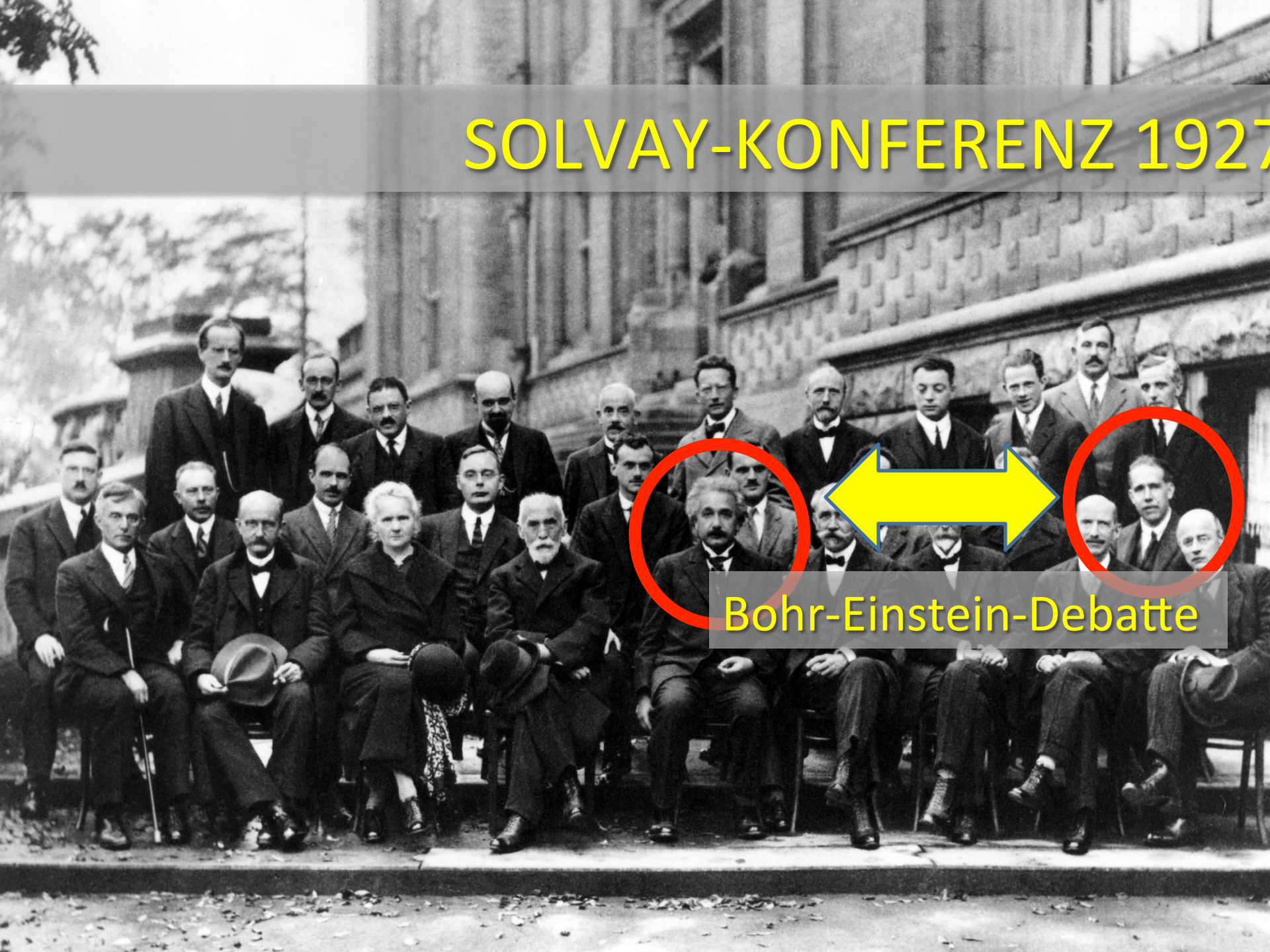
Heisenbergsche
Unschärferelation

Born Rule

# PHYSIKALISCHE REALITÄT



*„If […] we can predict with certainty, the value of a physical quantity, then there exists an element of reality corresponding to that quantity.”*

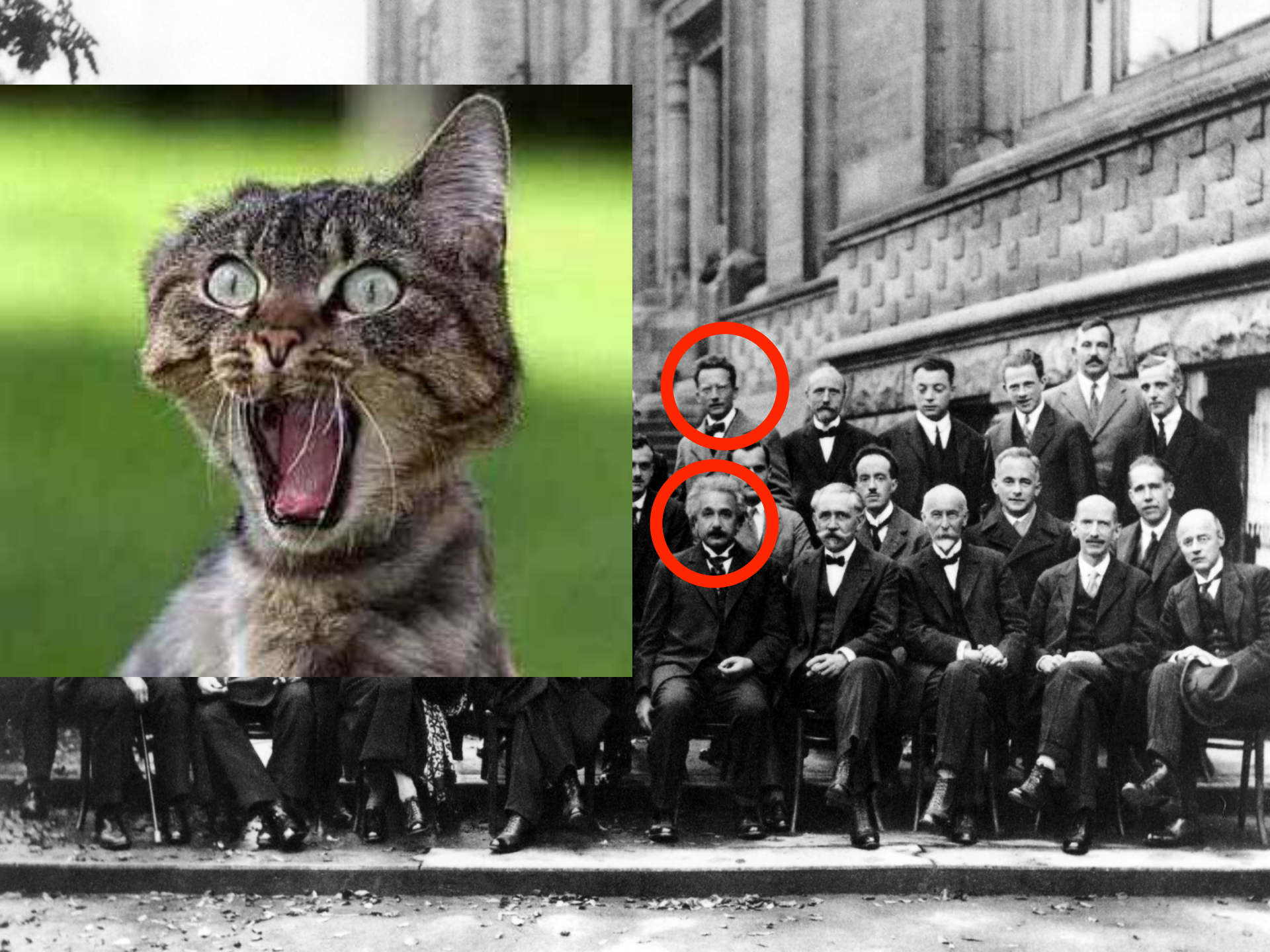

SOLVAY-KONFERENZ 1927
Bohr-Einstein-Debatte

# EINSTEINS KRITIK

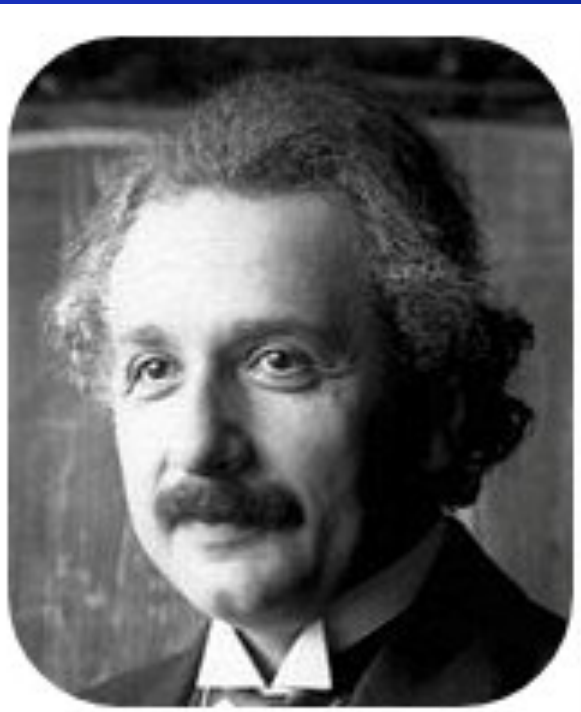
*REALITÄTSKRITERIUM*

*OBJEKTIVER ZUFALL*

*VOLLSTÄNDIGKEIT*



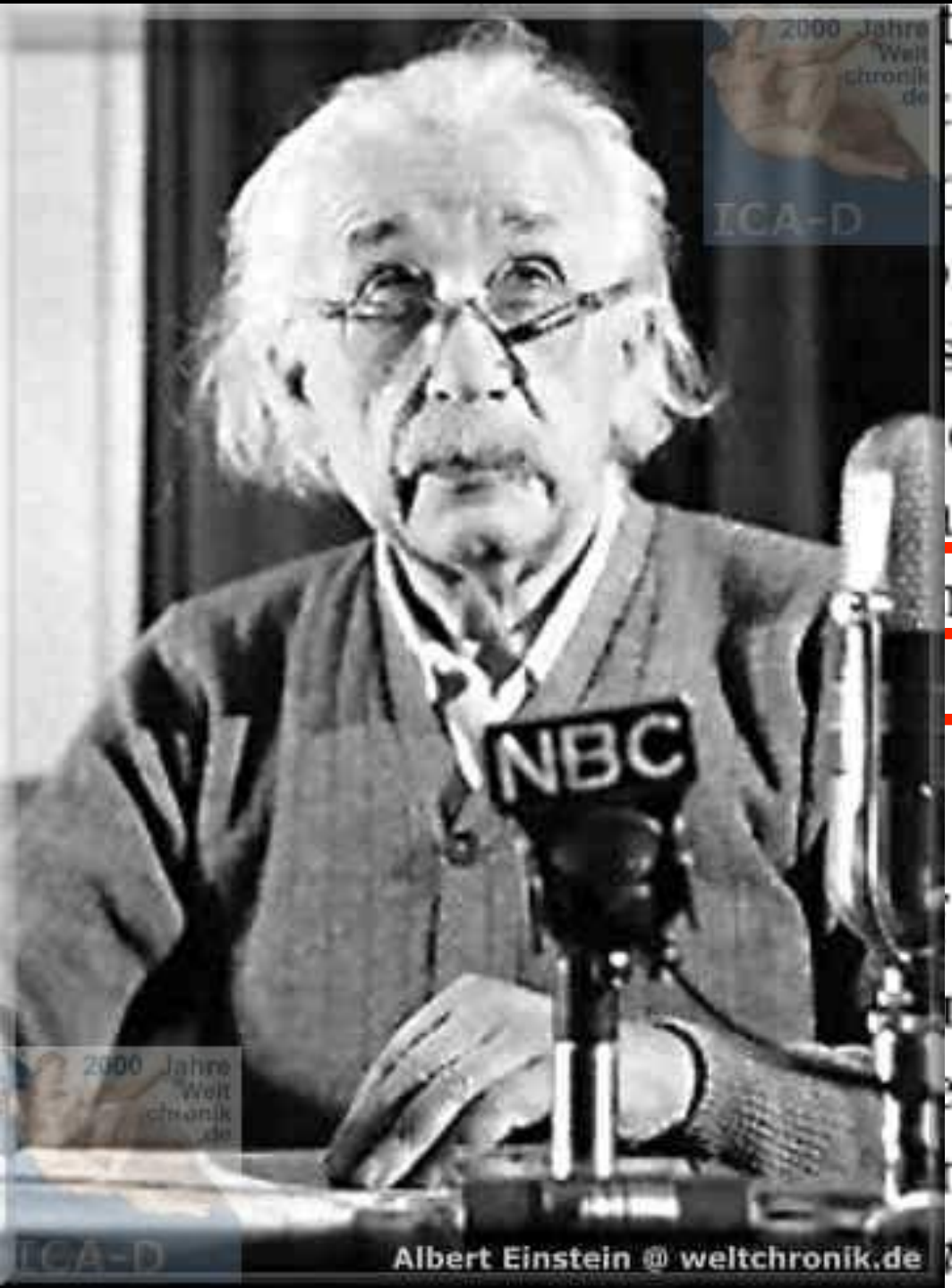
# EINSTEIN-PODOLSKY-ROSEN PARADOXON



A. Einstein

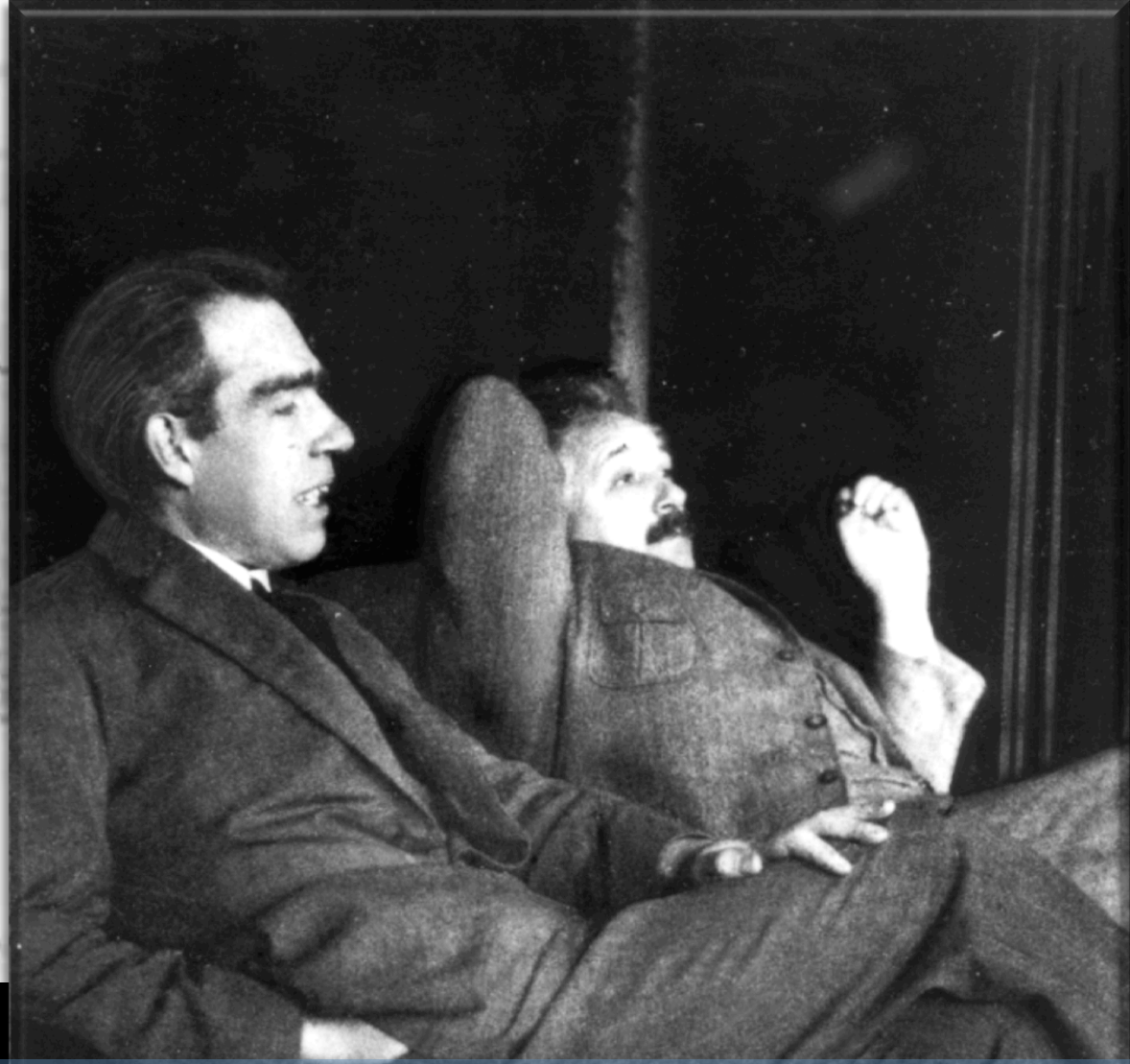
B. Podolsky

N. Rosen



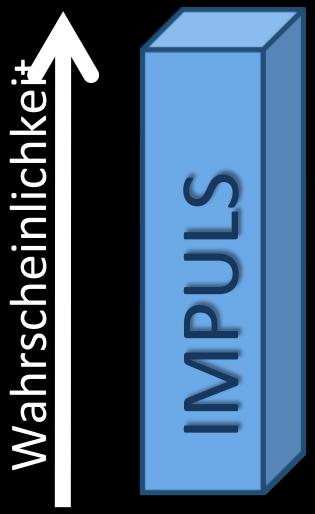

the wave function
ion of the physical
onclusion that two
ncommuting oper-
s reality. Thus the
egation of the only
re thus forced to
mechanical descrip-
by wave functions

conclusion on the
reality is not suf-
ne would not arrive
ed that two or more
regarded as simul-
*ly when they can be*



# LIEFERT ψ EINE VOLLSTÄNDIGE BESCHREIBUNG?

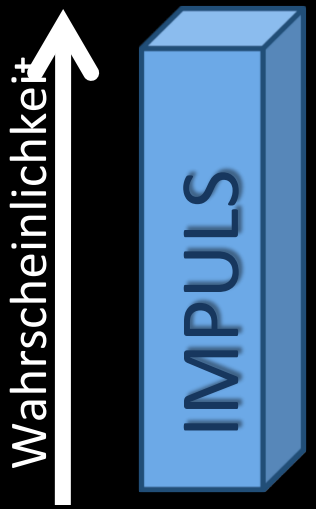
IMPULS-
MESSUNG!



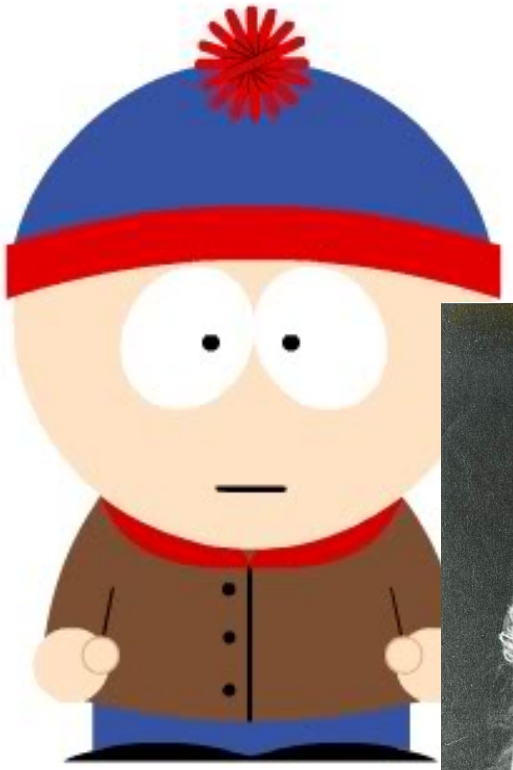

A

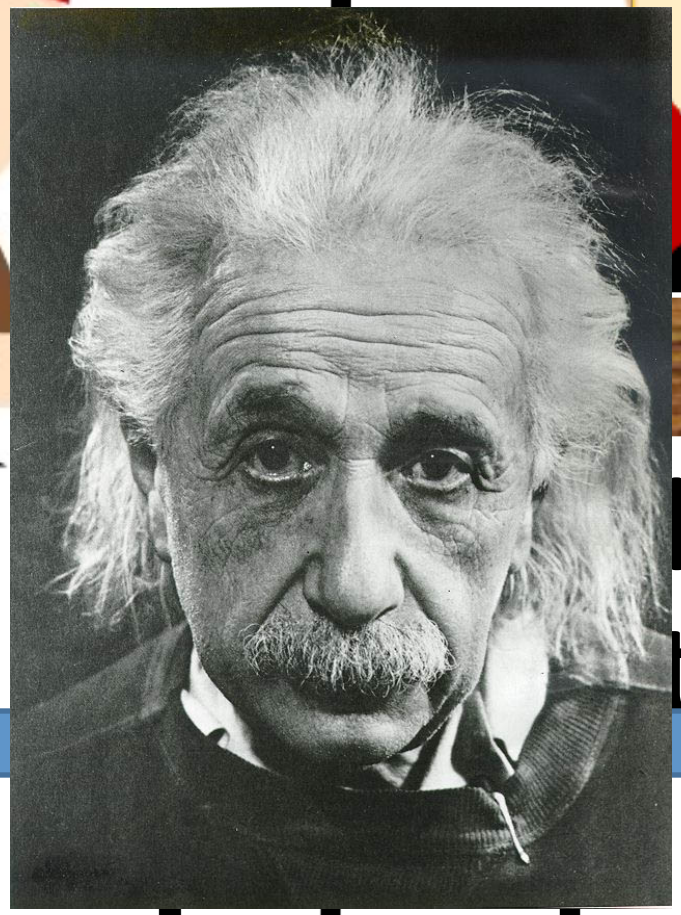
Impulserhaltungssatz

KEINE
MESSUNG!




B



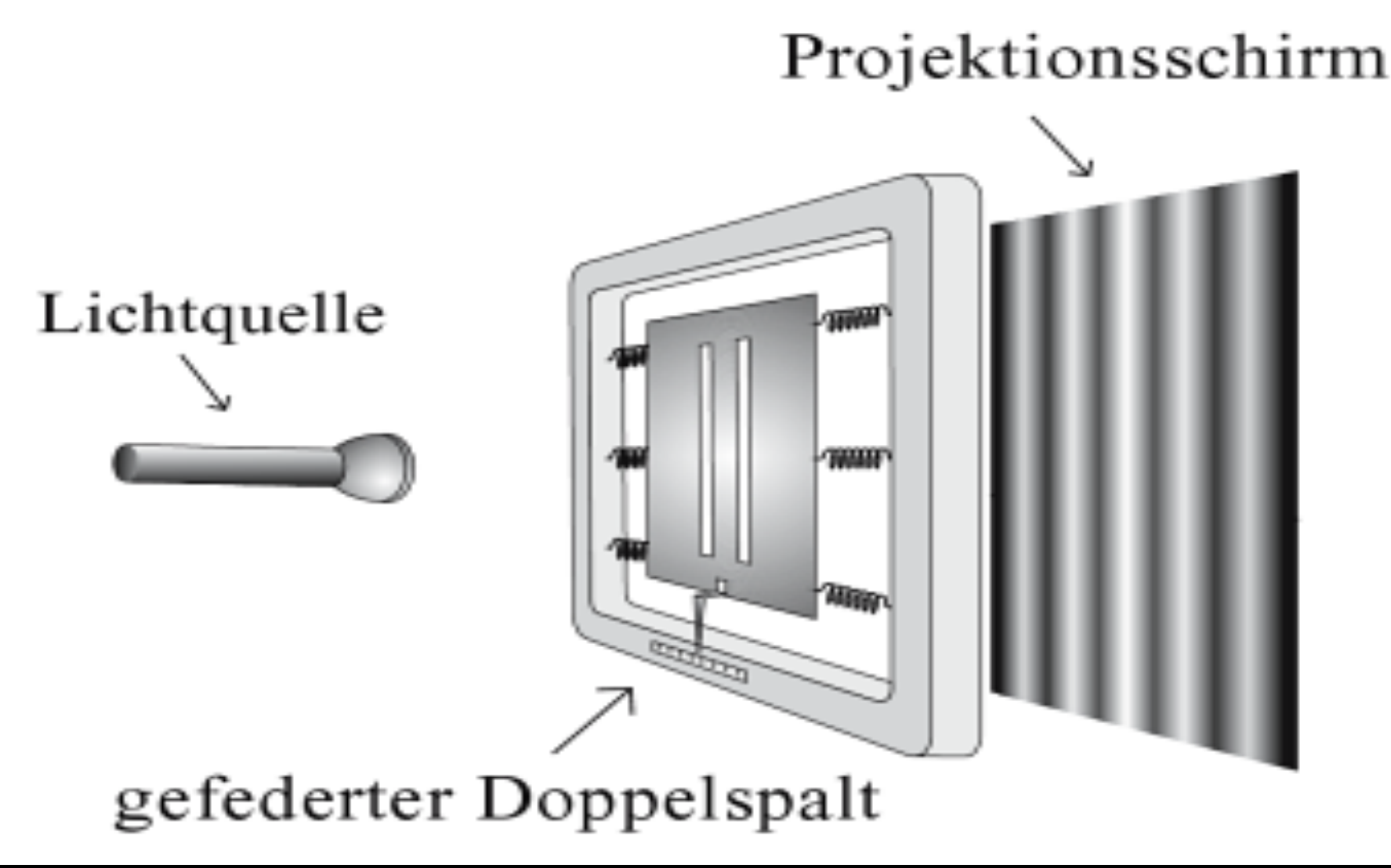


puls oder

$x_1$

t? $x_2$

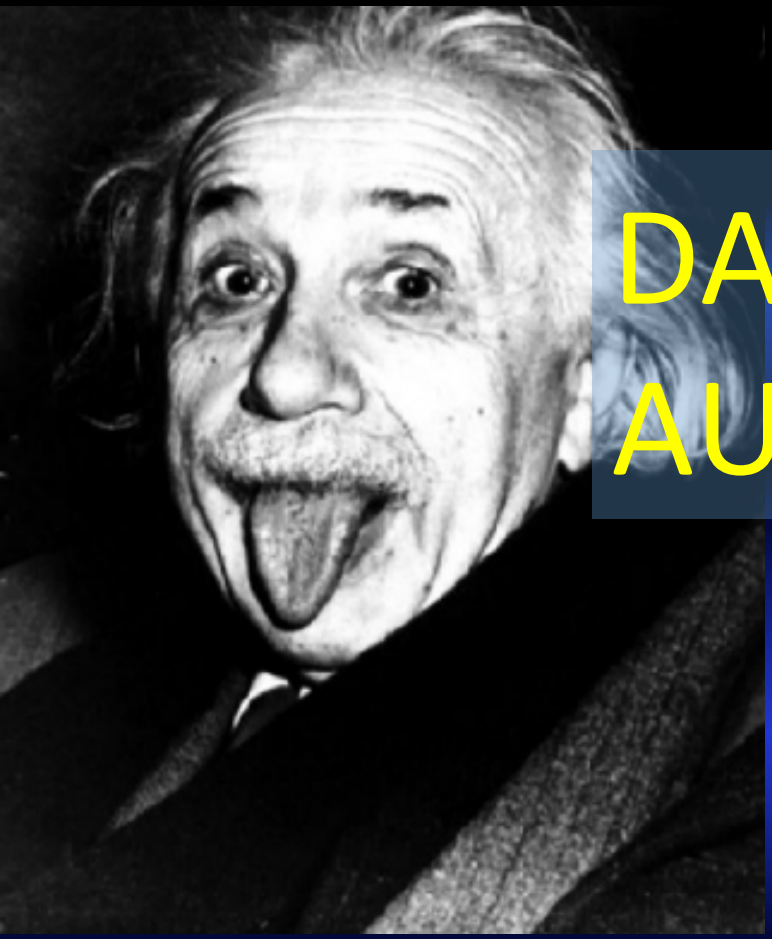
# BOHRS ANTWORT


Projektionsschirm
Lichtquelle
gefederter Doppelspalt

**Bohr: Who are you to tell God what to do?**

**Hawking: God does not play dice, but sometimes throws them where they cannot be seen : )**

**Pratchett: God does not play dice; it‘s rather a complex version of poker in a pitch-dark room, with blank cards, for infinite stakes, with a Dealer, who won‘t tell you the rules and who smiles all the time :D**



# DANKE FÜR IHRE AUFMERKSAMKEIT!