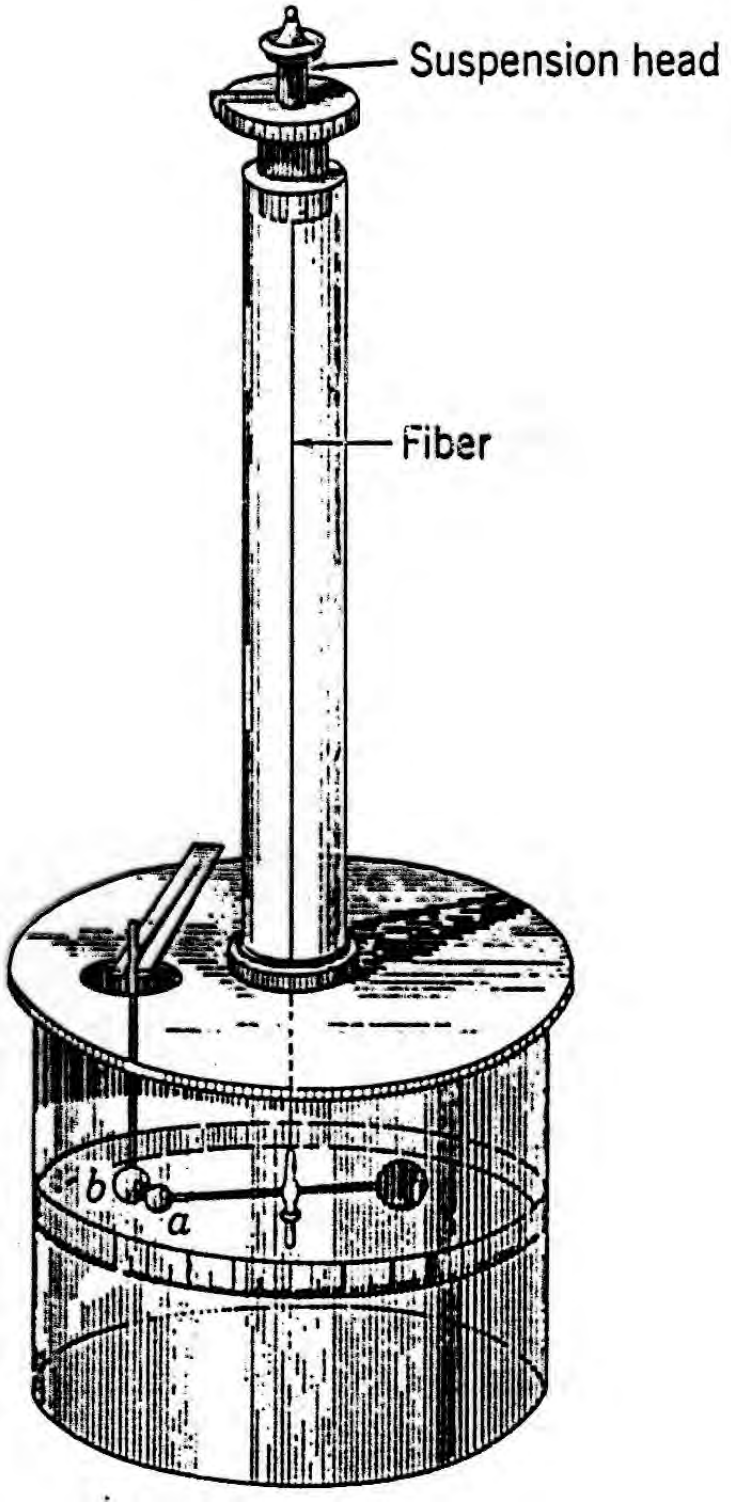
Entfallender Versuch

Coulombsche Drehwaage



Coulomb's torsion balance, from his 1785 memoir to the French Academy of Sciences.

Das Coulombgesetz

cgs

SI

Wie stark ist die elektrische Kraft?

Coulomb WW im Atom

COULOMB Gesetz: Exponent 2+q?

		$1/r^{2+q}$	photon rest mass
Author (date)	Experimental scheme	Deviation of q	Upper limit on m_γ/g
Robison (1769)	Gravitational torque on a pivot arm	6×10^{-2}	4×10^{-40}
Cavendish (1773)	Two concentric metal spheres	2×10^{-2}	1×10^{-40}
Coulomb (1785)	Torsion balance	4×10^{-2}	$\sim 10^{-39}$
Maxwell (1873)	Two concentric spheres	5×10^{-5}	1×10^{-41}
Plimpton and Lawton (1936)	Two concentric spheres	2×10^{-9}	3.4×10^{-44}
Cochran and Franken (1967)	Concentric cubical conductors	9.2×10^{-12}	3×10^{-45}
Bartlett *et al* (1970)	Five concentric spheres	1.3×10^{-13}	3×10^{-46}
Williams *et al* (1971)	Five concentric icosahedra	$(2.7 \pm 3.1) \times 10^{-16}$	1.6×10^{-47}
Fulcher (1985)	Improved on Williams' experiment	$(1.0 \pm 1.2) \times 10^{-16}$	1.6×10^{-47}
Crandall *et al* (1983)	Three concentric icosahedra	6×10^{-17}	8×10^{-48}
Ryan *et al* (1985)	Cryogenic experiment		$(1.5 \pm 1.4) \times 10^{-42}$

aus: Metrologia **41,** S136 (2004)

Proca A (1936) J. Phys. Radium Ser. VII **7**, 3473; (1937) ibidem **8**, 23

De Broglie L (1940) La Méchanique Ondulatoire du Photon, Une Nouvelle Théorie de Lumière, vol. 1, (Paris: Hermann) pp. 39–40

Elektrische Feldstärke und elektrisches Feld

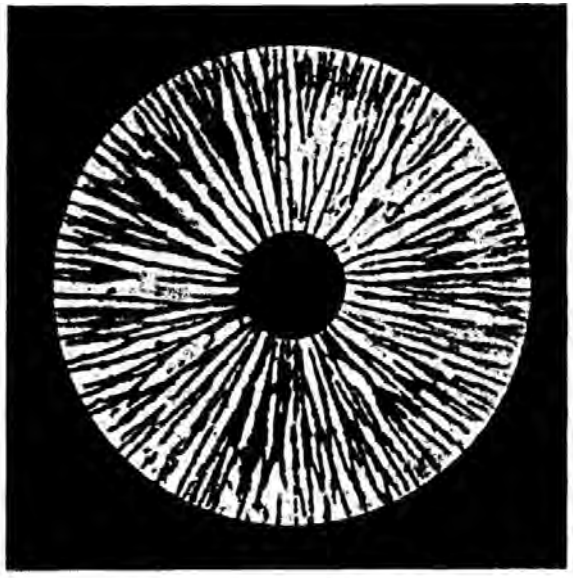


Abb. 19

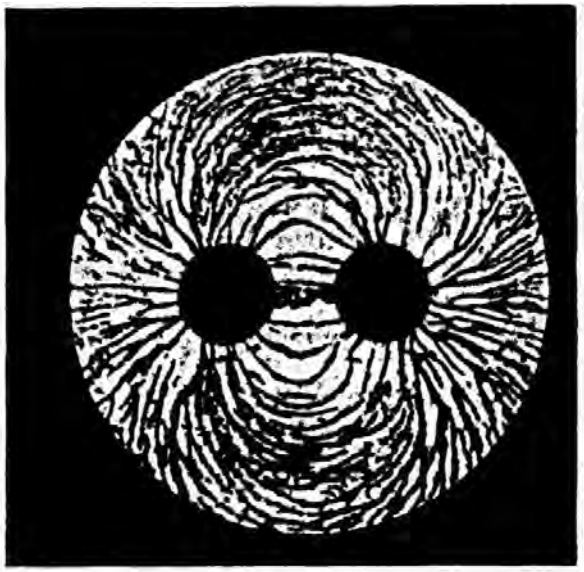


Abb. 20

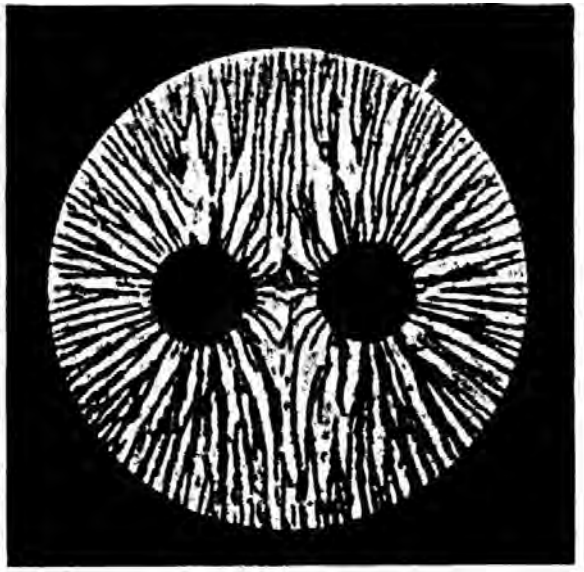


Abb. 21

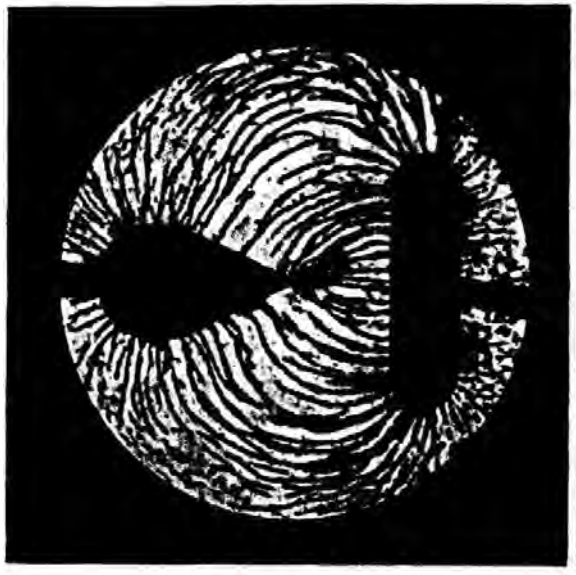
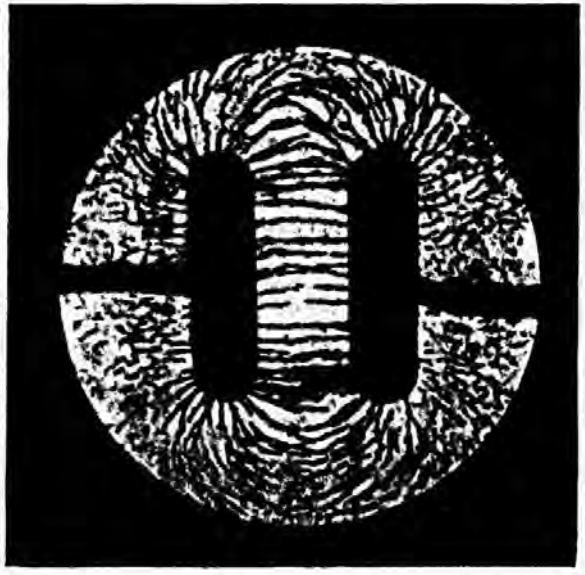


Abb. 22



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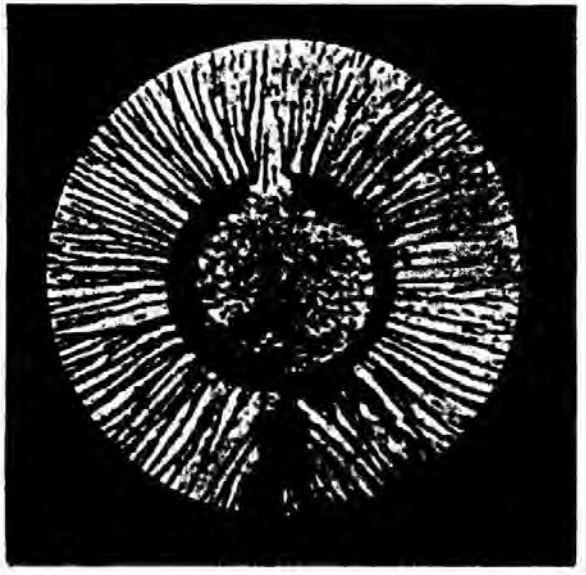


Abb. 24

Abb. 19–24 Elektrische Feldlinienbilder. Abb. 19 Einzelner geladener Pol; Abb. 20 Zwei entgegengesetzt geladene Pole; Abb. 21 Zwei gleichnamig geladene Pole; Abb. 22 Spitze und entgegengesetzt geladene Platte; Abb. 23 Zwei entgegengesetzt geladene, ebene Platten; Abb. 24 Geladener Hohlkörper mit kleiner Öffnung

Beispiele für elektrische Felder: Punktladung

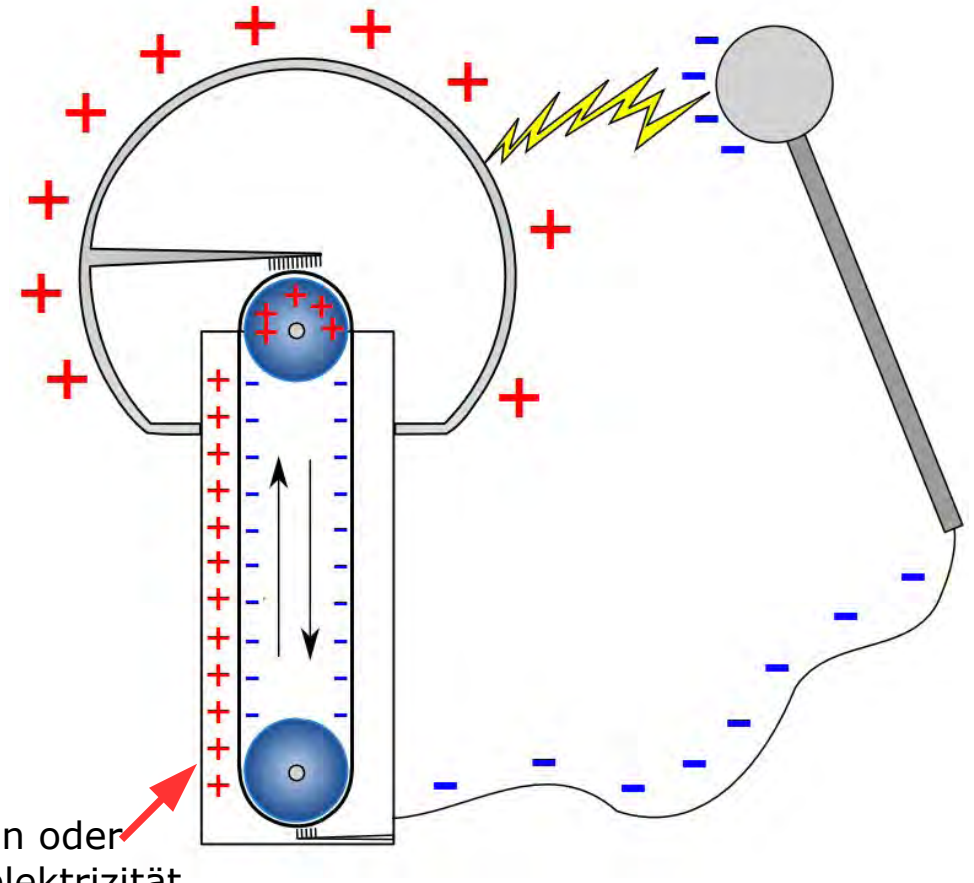
Beispiele für elektrische Felder: Superposition

Beispiele für elektrische Felder: Dipol

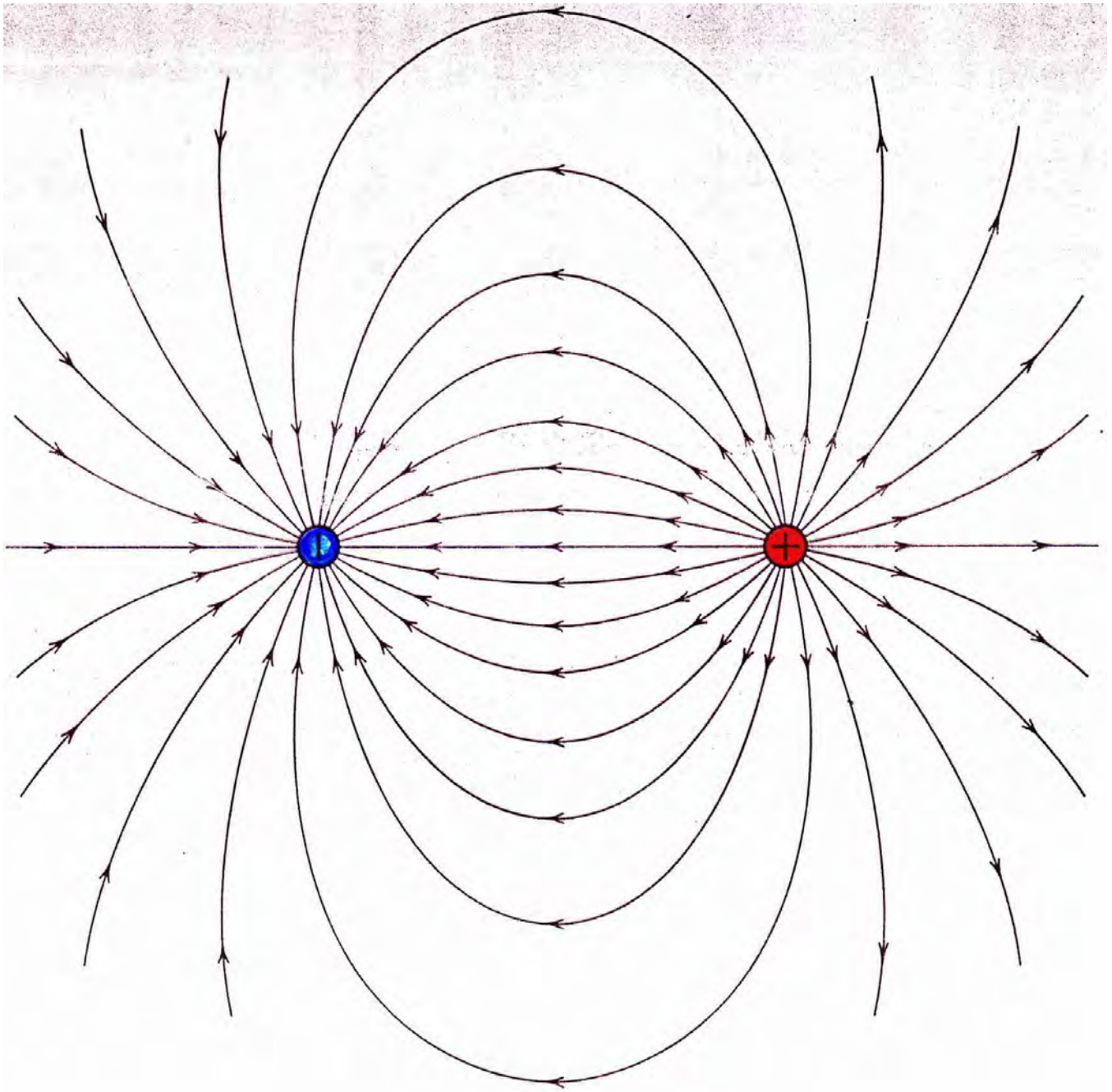
Entfallende Versuche zu Feldlinien

1. Fäden zwischen Kondensatorplatten
2. Pfeffer auf Öl in div. Feldgeometrien
3. Bandgenerator mit ''abstehenden Haaren'' - im Vakuum bis MV

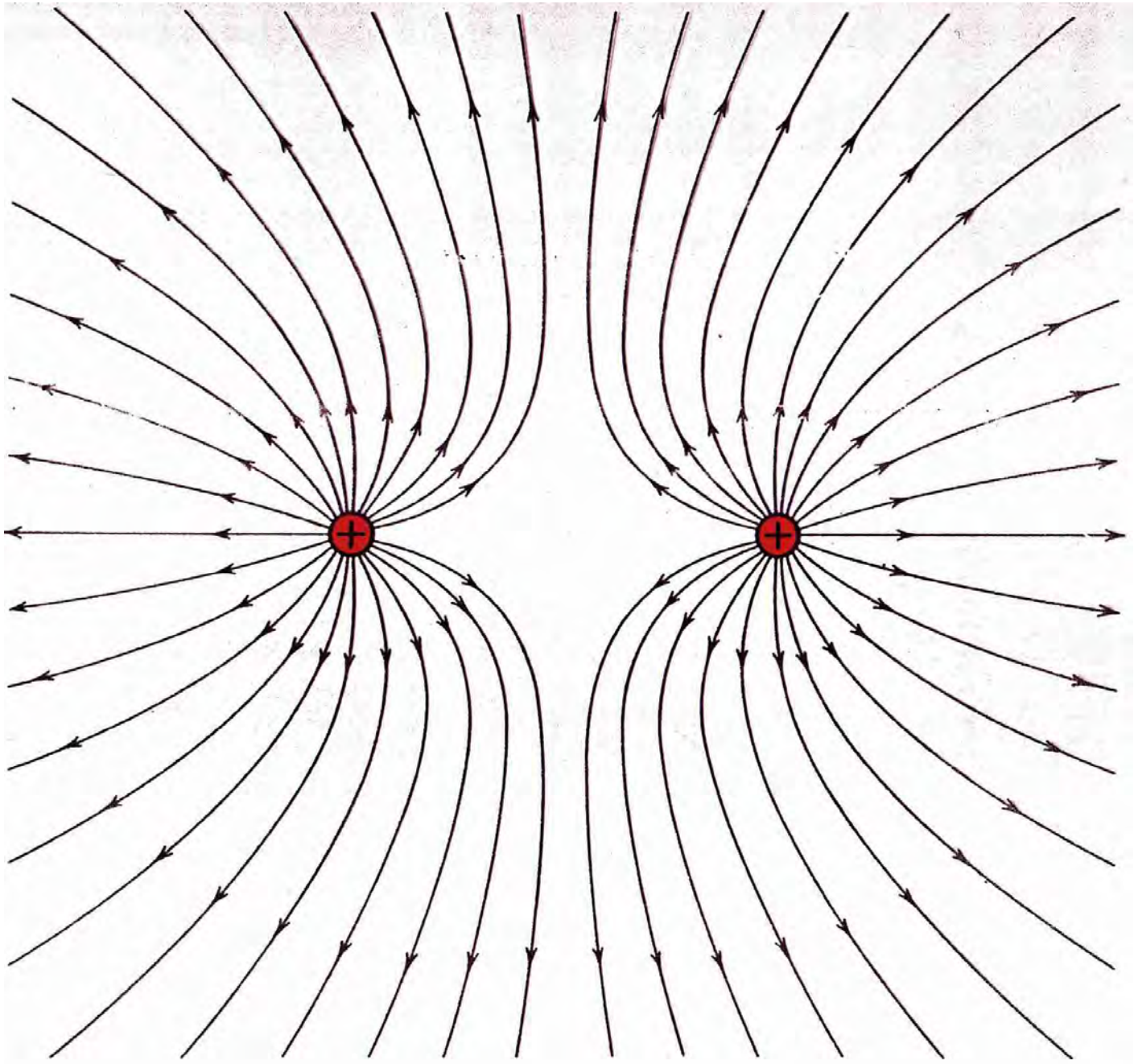
/de.wiktionary.org/wiki/Bandgenerator#/media/Datei:Maker_Faire_2008_San_Mateo_115_cropped.JPG



Feldlinien: 2 entgegengesetzte Ladungen



Feldlinien: 2 gleiche Ladungen



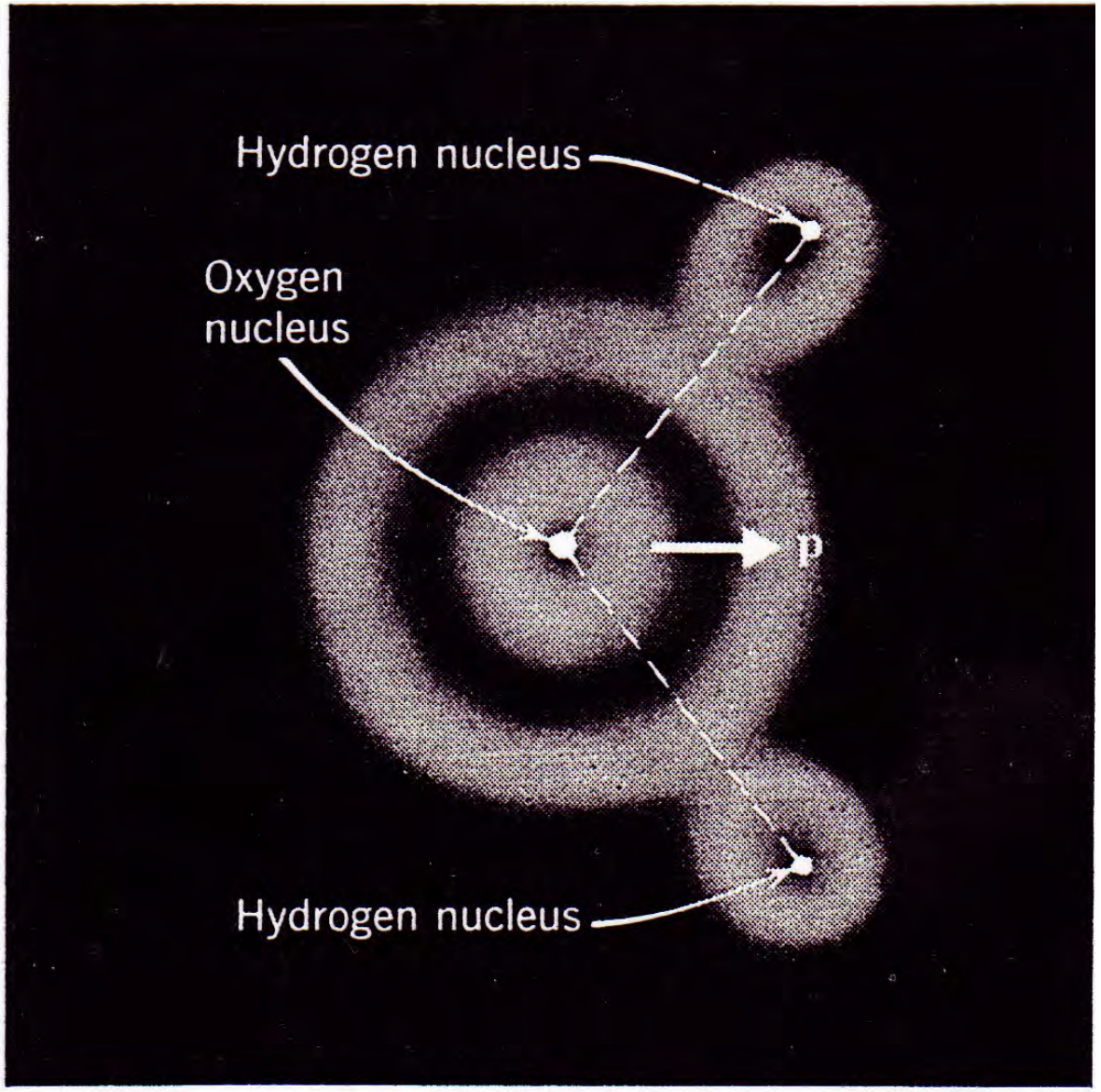
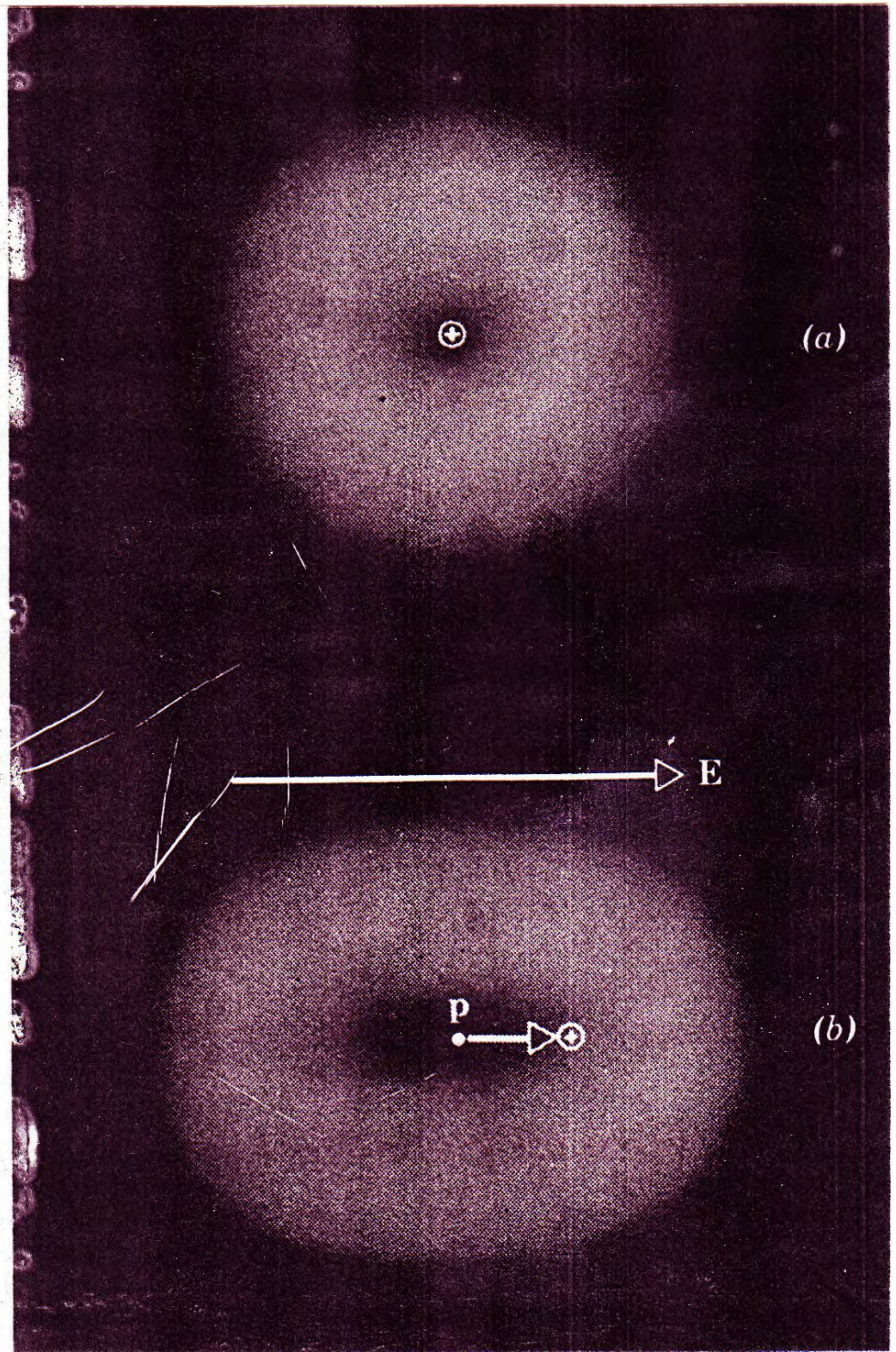


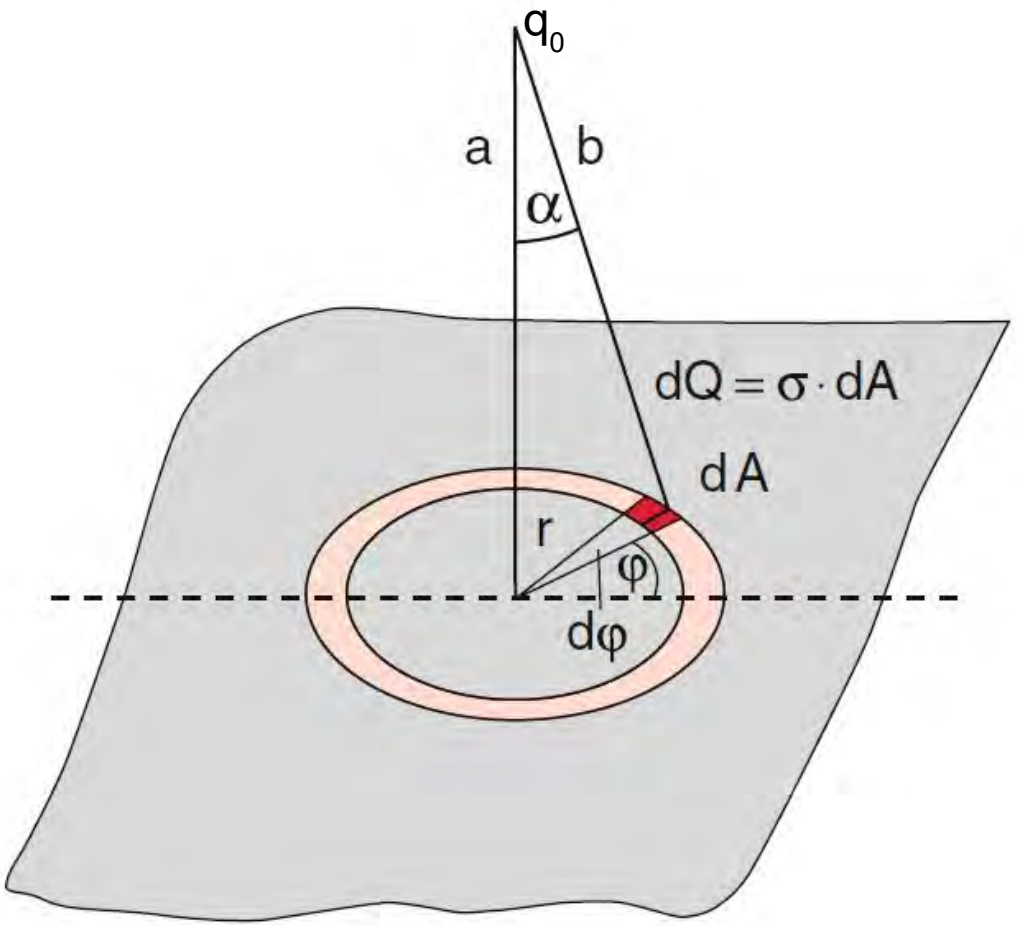
figure 29-11
A schematic representation of a water molecule, showing the three nuclei, the electron cloud, and the orientation of the dipole moment.



NICHT-
POLARES
MEDIUM

29-12

figure 29-12
(*a*) An atom, showing the nucleus and the electron cloud. The center of negative charge coincides with the center of positive charge, that is, with the nucleus. (*b*) If an external field **E** is applied, the electron cloud is distorted so that the center of negative charge, marked by the dot, and the center of positive charge no longer coincide. An electric dipole appears. The distortion is greatly exaggerated.


q0
a
b
α
dQ = σ · dA
dA
r
φ
dφ

Braunsche Röhre

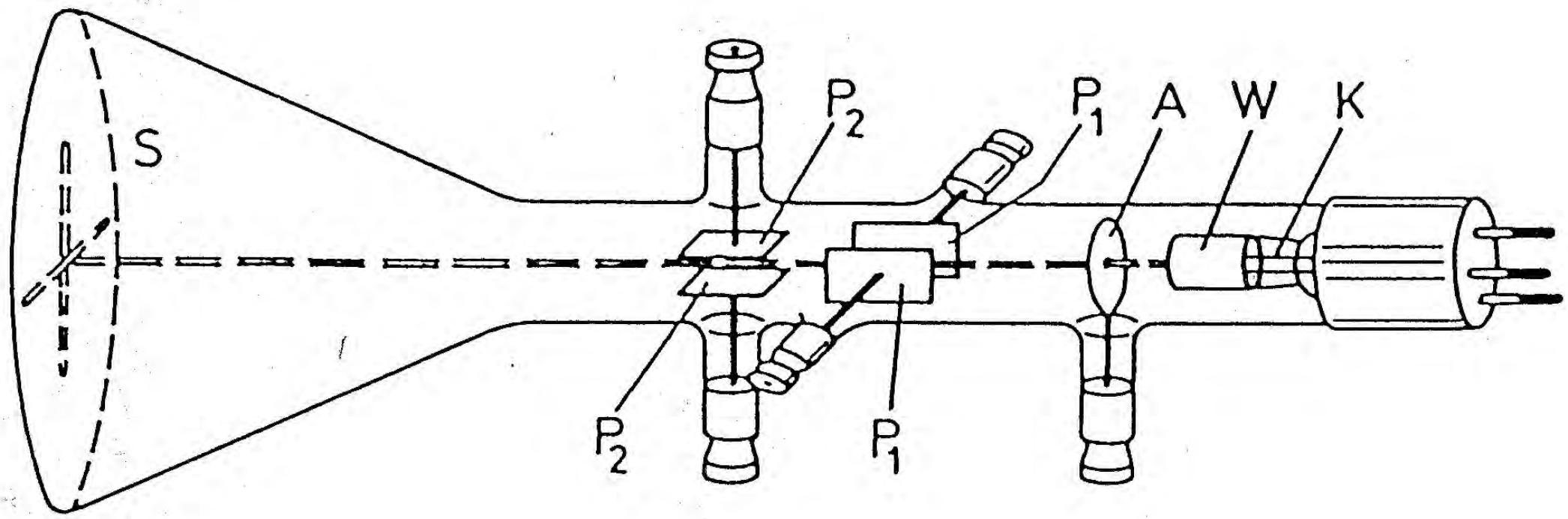
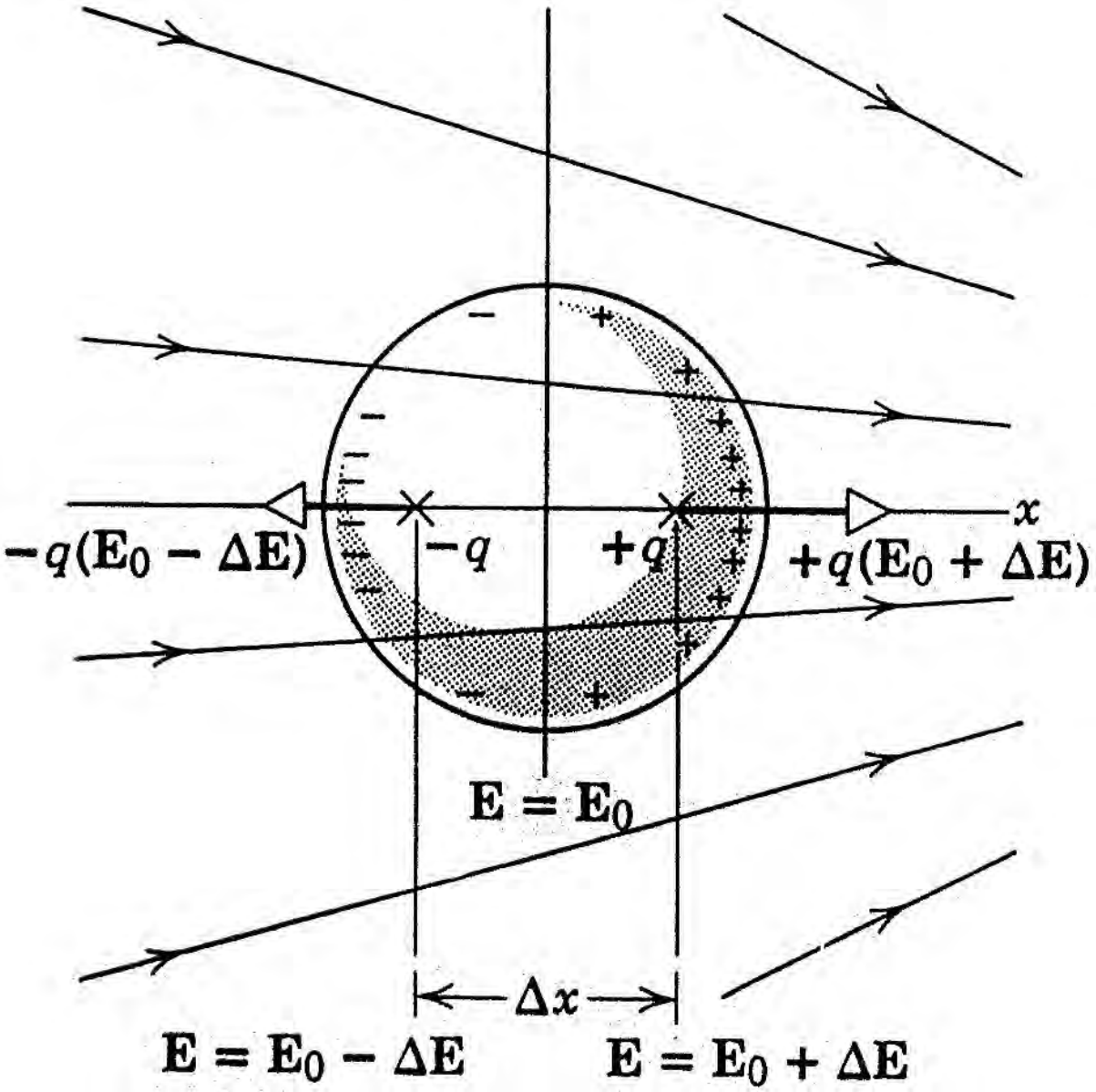


Abb. 502 Alte gaskonzentrierte Oszillographenröhre (Braunsche Röhre) mit Glühkathode K, Wehneltzylinder W, Anode A, Ablenkplatten P und Leuchtschirm S; (aus der Zeit um 1930)

Inhomogenes Feld: Kraft auf Influenzdipol



A hydrogen atom is composed of a nucleus containing a single proton, about which a single electron orbits. The electric force between the two particles is 2.3×10^{39} greater than the gravitational force! If we can adjust the distance between the two particles, can we find a separation at which the electric and gravitational forces are equal?

1. Yes, we must move the particles farther apart.
2. Yes, we must move the particles closer together.
3. no, at any distance